STATE OF ALASKA

SEAN PARNELL, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF PROJECT MANAGEMENT AND PERMITTING

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October 23, 2009

Charlotte MacCay
Permitting Manager
Pebble Limited Partnership
Anchorage, AK

Re: Ongoing Kinetic Geochem Testing and Request for State Concurrence for Termination of Certain Tests and Reduction of Monitoring Frequency for Other Tests

Dear Ms. MacCay:

The State of Alaska's Large Mine Permitting Team (LMPT) would like to amend and clarify our letter of October 9th regarding the termination of specific kinetic tests for the Pebble Project as outlined in the SRK Memorandum titled Status of Kinetic Test Program and Proposed Modifications DRAFT 2. The LMPT accepts that memorandum as the final version (FINAL) and recommends that the DRAFT 2 notation be removed.

In the DRAFT1 memo, thirty (30) kinetic tests were proposed to be terminated (Please Note: My October 9 letter had incorrectly referenced 23 kinetic tests. The correct number is 30.) LMPT staff had questions regarding fourteen of these tests and asked Stephen Day to explain his recommendation for the termination of ten of the tests. Stephen did not dispute the observations that led the State to question the termination of the ten tests; but, in the FINAL memo he provided a more complete explanation of the purpose of the specific tests, what data the tests needed to produce, and the rationale for terminating those tests. As a consequence, the LMPT believes that the 30 kinetic tests have answered the questions they were intended to address and that termination of those tests is appropriate.

The agencies also believe that the reduction of monitoring frequency for currently ongoing tests, as outlined in Table 6 of the FINAL Memorandum, will be adequate to discern trends in leachate chemistry and have no objections to the proposed changes to the monitoring frequency.

Additionally, the LMPT believes that Stephen Day's FINAL memo should be presented and discussed at a meeting of the Pebble Geochemistry Technical Working Group at the earliest opportunity. This meeting could be accomplished either in person or through an on-line presentation (webinar).

If you have any questions regarding this letter please do not hesitate to contact me at 907-269-8629.

Sincerely,

Thomas C. Crafford
Mining Coordinator

Cc:
Steve McGroarty, DNR
Pete McGee, DEC
Rick Fredericksen, DNR
Ed Fogels, DNR
Jim Vohden, DNR
Allan Nakanishi, DEC
Jack DiMarchi, DNR
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Table 1 - State Review Comments on Status of Kinetic Test Program and Proposed Modifications (SRK May 21, 2009)

Attachment	Test Type	Sample Category	Sample ID	Rock Type	Comments	Questions	SRK Response
A	HCT	Pre-Tertiary Volcano-Sedminatary Rock (Pebble West Zone)	n/a	n/a	No comments at this time.	No questions at this time.	
B	HC	Pre-Tertiary Plutonic Rock (Pebble West Zone)	n/a	n/a	No comments at this time	No questions at this time.	
C	HCT	Tertiary Rock (Pebble West Zone)	n/a	n/a	No comments at this time.	No questions at this time.	
D	HCT	Pre-Tertiary Volcano Sedminatary Rock (Pebble East Zone)	406717	V	Pb and Ag do not appear to be stable. Mo in slight up-trend for last 6-months.	Please review and indicate why termination is recommended.	It is acknowledged that the silver, lead and molybdenum all show variability but the main criteria of observing oxidation rates under strongly acidic conditions has been met. Some variability in metal release under these conditions can be expected
E	HCT	Pre-Tertiary Plutonic Rock (Pebble East Zone)	224182	C	As, Cd, Cu, and Pb appear to be increasing	Please review and indicate why termination is recommended.	Relative to other tests, these minor trends were not considered significant. The results provide stable indication of oxidation rates under the pH conditions observed.
E	HCT	Pre-Tertiary Plutonic Rock (Pebble East Zone)	226293	Gp	Sb, AS, Co, and Cu trends are parallel but higher than those for sample # 224956. Mn increasing in sample # 226293 while Mn decreasing in sample # 224956.	Please review and indicate why sample # 226293 was selected for termination over sample # 224956.	The recommendation was based on the preference to span the range of release rates observed for arsenic which is an important parameter in the Pebble Deposit. By continuing 224956, the range of release rates could be covered. The difference between Mn release rates was not considered as important as the other trace elements
E	HC	Pre-Tertiary Plutonic Rock (Pebble East Zone)	105456	Gs	Sb, As and V appear to be increasing.	Please review and indicate why termination is recommended.	Relative to other tests, these minor trends were not considered significant. The results provide stable indication of oxidation rates under the pH conditions observed.
F	HCT	Tertiary Rock (Pebble East Zone)	219189	TY	pH is decreasing. Sn, Ca, Mg, and K appear to be increasing.	Please review and indicate why termination is recommended.	The recommendation was based on the stability of oxidation rates. The shift in Ca, Mg and K is linked to the decrease in Na. This effect may be due to ion exchange but is not specifically linked to oxidation and trace element leaching so was not considered to have indicated instability
G	HCT	Barrel Test Samples	n/a	n/a	No comments at this time.	No questions at this time.	
H	HCT	Ore Composite Sample	n/a	n/a	No comments at this time.	No questions at this time.	
I	Column	Pre-Tertiary (Pebble West Zone)	3102-0568-0588	Y	SO4, Co, Cu, Mo and Se appear to be increasing.	Please review and indicate why termination is recommended.	Discussion of the rationale behind operating subaqueous column tests is provided in the text. While leachates show some variation in chemistry, the long duration of the tests is no longer providing relevant information for the prediction of subaqueous wastes under typical disposal conditions. The tests provide sufficient information on the performance of subaqueously disposed wastes. Some tests are continuing to evaluate long term trends
I	Column	Pre-Tertiary (Pebble West Zone)	3124-0188-0209	Y	Acidity and Ag appear to be increasing. Lower pH and higher acidity release rate compared to sample # 3069-0927-0947	Leachate trends appear similar to those of sample 3069-0927-0947, however, it is a different rock type. Does this affect the recommendation to terminate the HCT? Please explain rationale for termination	This test has confirmed that acidic rock disposed underwater remains acidic. The proposed continuation of test 3069-0927-0947 will continue to evaluate this finding. The difference between rock types is not considered sufficiently significant to warrant continuation of both tests.
J	Column	Tertiary (Pebble East Zone)	n/a	n/a	No comments at this time.	No questions at this time.	
K	HCT	2005 Tails	S2 Bulk Cleaner Tails	n/a	Mg and Mn appear to be increasing. Cu appears to be increasing over last 100 days. Mo appears to be increasing over last 700 days.	Please review and indicate why termination is recommended. If S2 and S1 are the same material, should at least one test continue?	The main variable of interest for the tailings is the correlation of oxidation rate with sulfur content. The stable oxidation rates have allowed this to be evaluated. The long term data shows that variations in trace element leaching occur but these are not considered to be major upward or downward trends. Continuation of one leach column containing similar tailings generated in 2005 is recommended.
K	HCT	2005 Tails	S1 Bulk Cleaner Tails	n/a	Mg appears to be increasing. Sb appears to be increasing over last 200 days. Cu appears to be increasing over last 250 days. Mo appears to be increasing over last 700 days.	Please review and indicate why termination is recommended. If S2 and S1 are the same material, should at least one test continue?	The main variable of interest for the tailings is the correlation of oxidation rate with sulfur content. The stable oxidation rates have allowed this to be evaluated. The long term data shows that variations in trace element leaching occur but these are not considered to be major upward or downward trends.
L	HC	2008 Tails	PP08-3365	Y - bulk tails	pH appears to be slightly decreasing. Cu numbers appear "noisy"	Please review and discuss NP/AP vs. calculated time to onset of acid conditions vs. recent leachate pH.	The main variable of interest for the tailings is the correlation of oxidation rate with sulfur content. The stable oxidation rates have allowed this to be evaluated. Discussion of copper leaching is provided in the text. Copper variability seems to be greater than other trace elements in long term tests. Therefore, it was not considered as a factor in selecting testwork for continuation. Delays to acid onset should not have been calculated in the case of samples with NP/AP exceeding 2. For some samples with NP/AP < 1, it might have been expected that acid conditions have developed by now. The lack of observed acidic conditions indicates the sulfide oxidation to-date has resulted in too little acid generation to result in acidic conditions. Four continuing tests will evaluate the potential for acid conditions to develop.
L	HCT	2008 Tails	PP08-3607	Y - bulk tails (cyclone slimes)	pH appears to be slightly decreasing. Cu numbers appear "noisy".	Please review and discuss NP/AP vs. calculated time to onset of acid conditions vs. recent leachate pH.	See above
L	HCT	2008 Tails	PP08-3614	G - bulk tails	pH appears to be slightly decreasing. Cu numbers appear "noisy".	Please review and discuss NP/AP vs. calculated time to onset of acid conditions vs. recent leachate pH	See above
L	HCT	2008 Tails	PP08-3610	G - bulk tails (cyclone slimes)	pH appears to be slightly decreasing. Cu numbers appear "noisy".	Please review and discuss NP/AP vs. calculated time to onset of acid conditions vs. recent leachate pH.	See above
M	Column	2005 Tails	S1-Scavenger Tails	n/a	Cu and Mg appears to be increasing over last 800 days.	Please review and indicate why termination is recommended.	The main factor considered for this column was the overall stability of leachate chemistry at low concentrations. The copper trend is believed to have flattened though the overall variation and trending is occurring at low leaching levels.

Purpose of tests undertaken:
Humidity cell tests (HCT) - to evaluate the oxidation rates of sulfide minerals. Oxidation controls acid generation which in turn is linked to depletion of acid neutralization minerals and decreases in solution pH. The potential for and timing of pH decreases can be deduced by evaluation of sulfate and major element (Ca, Mg, Na and K) release rates.
Column tests - to evaluate how reaction rates change when waste is placed underwater (e.g. following subaqueous disposal, or flooding by rising water levels in mine workings/pits). The expectation is that the oxygen-limited conditions imposed by the water cover will result in reduction in oxidation rates. Subaqueous columns

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Memo

To:	Jane Whitsett, Pebble Limited Partnership	**Date:**	September 14, 2009
cc:	Charlotte MacCay, Pebble Limited Partnership	**From:**	Claire Linklater Stephen Day
Subject:	Status of Kinetic Test Program and Proposed Modifications Pebble Project DRAFT 2	**Project #:**	1CN007.000

1 Executive Summary

Development of the Pebble Deposit could involve excavation of waste rock showing a range of potential for metal leaching (ML) and acid rock drainage (ARD). The mineralized rock associated with the ore body is generally classified as potentially ARD generating whereas overlying rocks deposited after the mineralizing event are generally classified as having low potential for ARD but with some "metal" leaching considerations.

Two types of tailings would be produced by processing Pebble Project ores. The major tailings stream would have low potential for ARD due to relatively low sulfide content. A second smaller stream is classified as potentially ARD generating due to its elevated sulfide content.

To evaluate actual leaching, an extensive kinetic test program was implemented in 2005 on rock and tailings samples. As the overall project has evolved, additional tests have been started on waste rock and tailings. In total, 68 rock and 18 tailings samples have been, or continue to be tested (some for more than 4 years).

Based on recent review of the data obtained, modifications to the test program are being proposed to recognize that some tests have satisfied their objectives by yielding stable leachate chemistry under non-acidic or acidic conditions. In these tests, the leachate chemistry is not expected to change for several years. The data can be used to develop geochemical criteria for waste management and to predict water quality.

The following table summarizes the overall program and the proposed modification to the program to allow for tests for which the objectives have been met and the test can be completed.

Test Material	Total Number of Tests	Tests Already Completed	Test Proposed to be Completed	Proposed Ongoing Tests
Rock	74	23	23	28
Tailings	20	2	7	11

For ongoing tests, it is proposed to reduce monitoring frequency because long term trends can be defined by less frequent analysis of leachates. Most parameters would be reduced from analysis every other week to analysis every fourth week.

2 Introduction

2.1 Background

To support mine planning for the Pebble Project, a detailed environmental geochemical characterization program is ongoing focused on materials that may constitute wastes generated by the mine.

The aims of the program are to:

- Geochemically characterize materials that could be produced during mining and milling and determine their likely geochemical behavior following disturbance by mining activities;
- Provide data that can be used to make decisions about waste management approaches; and
- Obtain information that can be used to estimate the chemistry of water in contact with these materials.

The program commenced in 2004 and since then a large body of data have been obtained. Although a large proportion of the planned testwork is complete, a number of longer term kinetic weathering tests are ongoing (humidity cells, subaqueous columns and field barrel tests).

Kinetic tests provide specific data to answer the questions of whether rock/tailings could generate acid rock drainage (ARD) (depending on how the material is managed), when ARD would be generated, and how rates of leaching are related to factors such as mineralogy, sulfur, metal content, leachate chemistry and disposal conditions. Each test provides information on these aspects and is usually continued until the test results no longer add significant new information to the understanding of the metal leaching and ARD (ML/ARD) aspects of the project.

Thorough review of the test data has occurred at various times and decisions made to finish or continue tests as a result of trends in leachate chemistry. The duration of tests at completion is determined by the timing of these reviews and the date the tests started. There is no correlation of the actual termination date with short term effects observed in leachate chemistry trends.

The kinetic testwork program includes both laboratory and field tests. This memorandum describes:

- the status of the laboratory-based component of the kinetic testwork program at the current time and makes recommendations for completion of a number of the tests; and
- proposes reduction in monitoring frequency.

The program includes study of waste rock and tailings and these are discussed in turn in the later sections.

The first draft of this memorandum was dated May 21, 2009. Following a review dated August 19, 2009 by representatives the Alaska Department of Natural Resources (ADNR) and Alaska Department of Environmental Conservation (ADEC), the memorandum was updated to provide clarification about the rationale for recommendations of specific tests. The text of this memorandum has been updated to reflect the comments raised during the review. Specific responses are provided in Attachment N

2.2 Geological Terminology and Overall Geochemical Characteristics

The geological setting will not be described in detail here. The main geological features of the Pebble Deposit are (1) porphyry mineralized Cretaceous (Pre-Tertiary) age sedimentary and intrusive rocks containing the copper, gold and molybdenum mineralization; and (2) overlying Tertiary age sedimentary, volcano-sedimentary and sedimentary rocks deposited on the eroded Cretaceous rocks.

The Tertiary rocks do not contain porphyry mineralization though are locally mineralized with iron sulfides.

Static geochemical characterization to date has determined that the Pre-Tertiary rocks have potential to generate ARD if not managed appropriately. In contrast, the Tertiary rocks have low potential for ARD due to generally low levels of iron sulfide minerals and relatively abundant acid neutralizing carbonate minerals.

The porphyry- mineralized pre-Tertiary rocks are described as being part of the West and East Zones which are distinctive mineralizing centers. The West Zone was discovered and tested first. The overlying Tertiary rocks are also assigned to the same zones but are continuous and unrelated to the pre-Tertiary zones. The geochemical characteristics for the zones are not significantly different in the context of the overall objectives of the geochemical characterization program.

2.3 Supporting Documents

The design of the geochemical characterization program for the Pebble Project has been described in several previous document the most comprehensive of which is "Pebble Project – Metal Leaching/Acid Rock Drainage Characterization - DRAFT Sampling and Analysis Plan" (June 2005).

The memorandum "Status of Kinetic Tests - Pebble Project" (November 22, 2006) (SRK 2006) previously described the status of the testwork and was provided to ADNR. Summaries of the kinetic test program have been provided as part of annual meetings with State of Alaska and Federal agency staff.

3 Definition of Stability and Endpoints of Kinetic Tests

3.1 Humidity Cells

The dominant protocol for Pebble Project kinetic testing is the humidity cell. Humidity cells operate under conditions in which oxygen is not limited as a reactant. The main intent of this type of test is to evaluate oxidation rates of sulfide minerals because oxidation is directly related to acid generation which in turn is linked to depletion of acid neutralization minerals and pH decreases. The potential for and timing of pH decreases can be deduced by evaluation of sulfate and major element (Ca, Mg. Na and K) release rates.

Leaching of trace elements may be related to the sulfide oxidation rate because many leachable trace elements of interest are associated either with sulfide minerals (e.g. copper) or the acid neutralizing minerals (eg manganese). Also, trace element leaching may be correlated with the bulk element composition. However, the main value of kinetic tests to evaluate trace element leaching is in observing the changes in leaching behavior when depression of pH occurs as acid neutralizing minerals are depleted. Actual leaching rates of trace elements observed in humidity cells often have limited direct application to water quality predictions because concentrations in pore waters are controlled by the solubility of secondary minerals rather than the rate at which they are released by oxidation and other reactions.

Therefore, the main metrics for evaluating the stability and endpoints of kinetic tests are:

- The stability of sulfate release as an indicator of stable oxidation rates. "Stable" is defined as a trend with low variability between observations compared to the overall trend.

- The calculated time to 'acidification' (decreases in pH of several units). This time is calculated by comparison of neutralizing mineral content with the rate at which its component elements (e.g. Ca, Mg) are being released. If the timeframe is many years, it is not of value to continue the test.
- The observation of pH decrease spanning several units as confirmation that acidification occurs and documentation of any changes in metal leaching rates in response to acidification.
- Trace element leaching rates may be used to define stability of test results if strong trends are observed for parameters occurring at enriched levels in the mineral deposit. Due to the use of low detection limits for leachate analysis, trace element leaching may be highly variable. It is also common for small-scale increasing and decreasing trends to be observed that have no apparent relationship to measured trends in major element chemistry. As indicated above, the main interest is in the significant changes that occur as pH changes by several units.
- A final consideration is that continuation of selected tests beyond the endpoints described above is useful to demonstrate that stable conditions are maintained.

3.2 Subaqueous Columns

Some subaqueous columns have been constructed to evaluate how reaction rates change when waste is placed underwater as may occur for example when waste rock is submerged at its disposal location or is subsequently flooded by rising water levels (e.g. mine backfill, pit walls). The expectation is that the oxygen-limited conditions imposed by the water cover result in reduction in oxidation rates.

Whereas the protocols for humidity cells use full aeration to ensure that oxidation of sulfides is not oxygen-limited, oxygen availability in subaqueous columns is a function of the water cover and the amount of water moving through the column as specific in the test procedure. The amount of water moving through the column also controls the leaching of products formed by oxidation of the sample. The procedure therefore provides data indicative of the weathering of wastes when they are initially placed under a shallow water cover. However application of these data to long term prediction of pore water chemistry for deeply buried and flooded wastes under slow moving water conditions is limited. The number of pore volumes flushed through the column is usually far greater than the water exchange occurring under typical disposal conditions.

Subaqueous columns are usually continued until initial flushing effects caused by removal of pre-existing oxidation products have dissipated. The leachate chemistry provides a general indication of weathering chemistry under subaqueous conditions.

3.3 Unsaturated Columns

Two unsaturated columns are being operated on scavenger (low sulfide) tailings. These tests are intended to provide an indication of the combined effects of oxidation at the surface of tailings with interaction of weathering products deeper in the column.

3.4 Duration of Testwork

Price (1997) notes that stabilization of leachate chemistry "often takes 40 weeks and can sometimes take over 60 weeks, and significant changes may take place even after several years. Therefore, the criteria on which to close down a cell depend on the site specific objectives and the degree (of) uncertainty in the predictions". The general approach to testwork duration for the Pebble Project kinetic tests has been to consider the objective of the test and how the data obtained can be used for predictions related to waste management and water chemistry. However, in this current consideration of the testwork results, tests are required to operate for a minimum time frame of a year (52 weeks) before assessing stability.

4 Waste Rock Samples

4.1 Introduction

The laboratory program includes both humidity cell tests and subaqueous columns to examine reaction kinetics under unsaturated conditions and under flooded conditions, respectively. The overall number of tests in program classified according to age (Tertiary and Pre-Tertiary), rock type (plutonic, sedimentary, volcanic) and zone (West and East) are summarized in Figures 1 and 2.

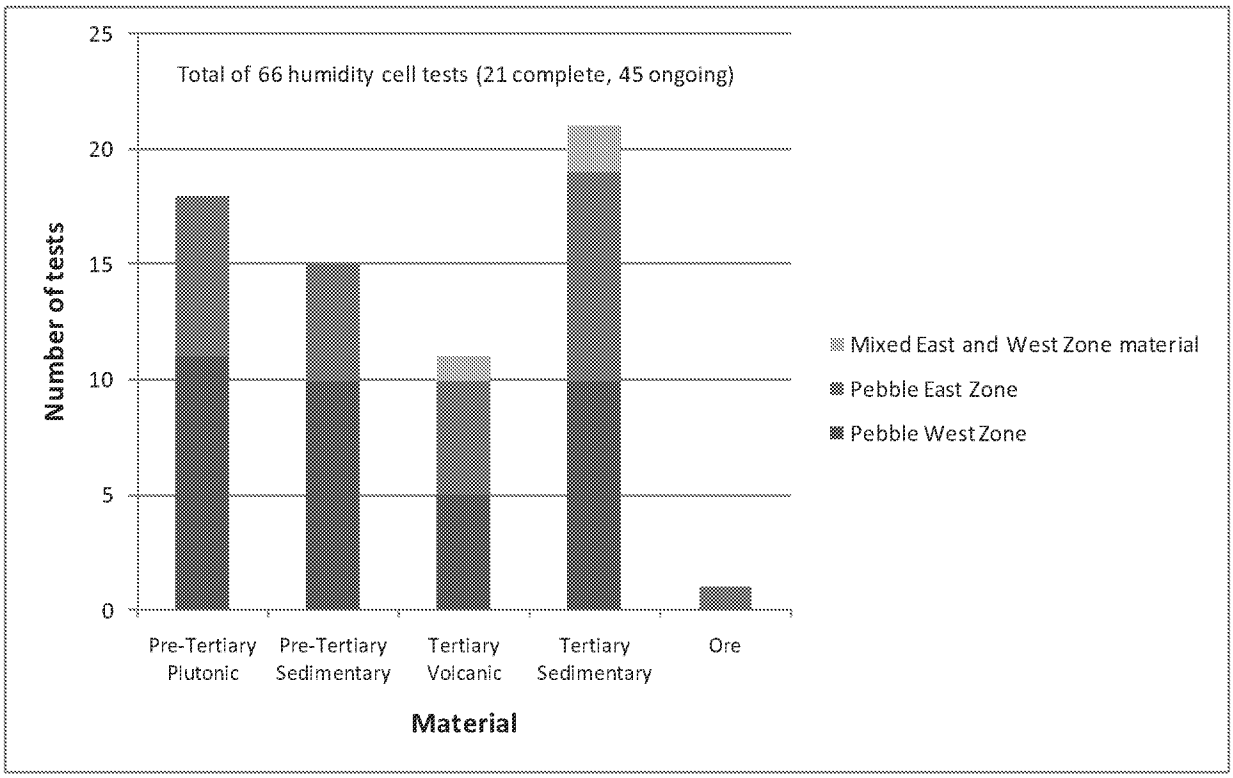

Figure 1: Summary of Number of Rock Humidity Cells

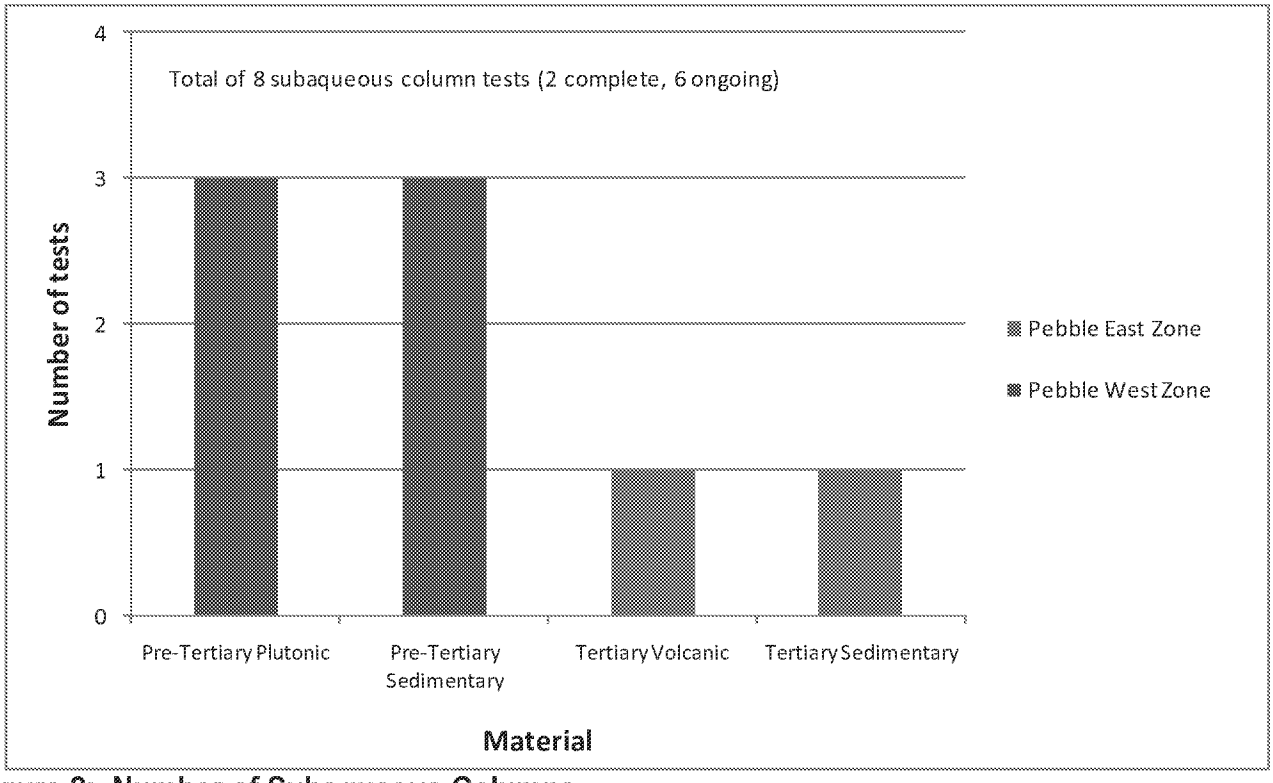

Figure 2: Number of Subaqueous Columns

4.2 Humidity Cells

4.2.1 Introduction

Tables 1 to 3 summarize characteristics of the samples used in each test, and give information about the status of each test. Also given in the tables are recommendations to complete those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale.

The following sections describe briefly selected outcomes of the testwork, and give justifications for recommended changes to the program.

4.2.2 Pebble West Zone: Pre-Tertiary

As summarized in Section 1.2, Pre-Tertiary rock generally has the potential to generate ARD. However, the rock contains a range of neutralization potentials (NP) resulting in the delay to appearance of ARD spanning decades. Samples for testing were deliberately selected to evaluate both the development of acidic conditions and leaching effects under non-acidic conditions.

Two categories of rock are being characterized:

- Volcano-sedimentary - Eight samples of wacke (W) and mudstone/siltstone (Y) were tested. Seven tests were completed in 2005 (as described by SRK 2006) because they had either generated acid or were not expected to generate acid for many years. One test (Sample 3124-0188-0209) is ongoing (over 4 years of testing). Graphs showing results are provided in Attachment A.

- Plutonic - Nine samples of plutonic igneous rocks were tested. Eight tests were completed in 2005 (SRK 2006) for the same reason indicated above. One test (Sample 3069-0927-0947) is ongoing (over 4 years of testing). Graphs showing results are provided in Attachment B.

The two ongoing samples are showing stable leachate chemistry under acidic conditions.

The objectives of these tests have been met. They have demonstrated that samples with relatively low NP (<10 kg $CaCO_3$/t) have the potential to generate acid, either immediately, or following relatively short test durations. Samples with higher NP produced pH neutral leachate. Rates of oxidation have been shown to correlate with sulfur content of the rocks. Stable metal release rates have now been collected for a range of pH conditions, sample types and bulk chemistries.

It is proposed that the two ongoing tests are continued to provide long-term data under acidic conditions for one sample from each rock type category (Table 1).

4.2.3 Pebble West Zone: Tertiary

Nine Pebble West Zone Tertiary rock samples have been or continue to be tested, with two samples being tested as triplicates to assess reproducibility of results (total of 13 tests). Of these thirteen tests, six have already been completed (as described in SRK 2006) and seven are ongoing now for over 3 years. Graphs showing results are provided in Attachment C.

The majority of Tertiary rock types are not expected to generate acid. A very small component contains elevated pyrite concentrations and may generate acid. Two samples in this category are being tested. The program is designed primarily to assess element leaching under non-acidic conditions and relationships between sulfide content and element leaching.

Most samples now show stable leachate chemistry enabling leaching rates to be compared to bulk rock characteristics. Therefore, the objectives of the tests have been met. All samples have generated leachates that were pH neutral or slightly alkaline. Release rates for the majority of parameters are either stable or gradually decreasing with time. The exceptions are:

- Sample 4157 439-471 (sedimentary rock type, TF). This sample has AP of 117 kg $CaCO_3$/t compared to typical values an order of magnitude lower and consequently elevated sulfate release compared to other samples. The leachate pH remains neutral because the sample has significant NP. The sulfate release rate appears to be increasing very gradually over time.

- Sample 4292 415-430 (volcanic rock type, TA/TD) – Continue to evaluate fluoride increase and provide long term data for this rock category.

Both these samples have NP/AP less than 1 indicating a possibility that acid conditions could develop over the very long term (6 to 11 years based on the current rates of depletion of NP). It is proposed that these two tests remain in place to allow fluoride and sulfate release rates to stabilize. They also provide a possible opportunity to observe acidic conditions for Tertiary waste rock, should such conditions arise.

All other samples studies have lower ARD potential based on NP/APs mostly well above 1 and also have lower APs. Acidic conditions are not expected to develop. It is proposed that all ongoing tests in this category be completed after being tested for 3 to 4 years. These tests are:

- Sample 115-0142-0163 (sedimentary rock type, TC) - This sample was tested in triplicate. Reproducibility of the triplicate was very good. Given that reproducibility has been demonstrated and the leachate chemistry is stable the objectives of the tests have been met.
- Sample 4292 685-695 (sedimentary rock type, TC) – Sulfate release rates are stable
- 3102-0958-0978 (volcanic rock type, TB, triplicate test) - Sulfate release rates are stable and reproducibility has been demonstrated.

4.2.4 Pebble East Zone: Pre-Tertiary

As was the case with the Pebble West zone samples, the same two categories of rock are being characterized:

- Volcano-sedimentary – Five samples are being characterized, all from the most abundant lithology, meta-mudstone (Y). Graphs showing results are provided in Attachment D.
- Plutonic - Seven samples are being tested, six from the volumetrically abundant granodiorite lithology, and one diorite sample. Graphs showing results are provided in Attachment E.

The samples are showing similar trends to those shown by the Pebble West Zone samples. For example, samples with relatively low NP (less than 10 kg $CaCO_3$/t) have been demonstrated to generate acid, either immediately, or following relatively short test durations. Samples with higher NP are associated with neutral pH leachate.

After detailed examination of the trends that have developed, it is proposed that the following five tests be completed after over a year of testing:

Volcano-sedimentary samples

- Sample 406717 – Acidic conditions have developed in this test as would be expected on the basis of the NP/AP. Sulfate release for this sample is stable and so the objective of the test has been met.
- Sample 107326 – This sample is showing trends very similar to Sample 107172 (neutral pH leachate, rising Mo release rates). It is proposed that this test be completed, while the test involving the comparable Sample 107172 is continued.

Plutonic samples

- Sample 224182 – Mildly acidic conditions have developed in this test as would be expected on the basis of the NP/AP ratio. The sulfate release rate for this sample is stable and so the objective of the test has been met.
- Sample 226293 – The sample has NP/AP>1 and is giving pH neutral leachate as expected. Most metal release rates are stable, although Mo release is decreasing gradually, and Sn release is increasing. Sample 224956 is showing very similar trends. It is proposed that the test involving Sample 226293 be terminated, whilst the test involving Sample 224956 continue.
- Sample 105456 - Acidic conditions have developed in this test as would be expected on the basis of the low NP, and NP/AP<1. The sulfate release rate for this sample is stable and so the objective of the test has been met.

Seven tests will continue because pH and release rates for sulfate and important trace elements under non-acidic and acidic conditions are changing

4.2.5 Pebble East Zone: Tertiary

Thirteen Pebble East Zone samples are being tested. Graphs showing results are provided in Attachment F. As was the case with the Pebble West zone samples, the majority of these samples were not expected to generate acid. Most tests now show stable sulfate release rates; therefore, the objectives of the tests have been met. All samples have generated leachates that were pH neutral or slightly alkaline as expected from their bulk characteristics.

It is proposed that most of these tests be completed following over a year of testing as the objectives of the tests have been met. Exceptions are the following tests, which should continue:

- Samples 220366 and Sample 221502 - These tests were started in November 2008 to provide additional coverage of the range of NP/AP in the Tertiary rocks types. The leachate pH does not yet appear to have stabilized and pHs are below 6.
- Sample 104772 – The leachate pH is near 5 and slightly below the pH of deioinized water in the test. The pH is gradually decreasing with time and accompanied by coincident increase in metal release rates. This sample shows the highest release rates for some metals, e.g. Cd, Cu and Zn.

4.2.6 Barrel Tests Samples

Ten samples (four Pre-Tertiary and six Tertiary) are being characterized in field (barrel) tests and equivalent humidity cell tests. They provide an opportunity to obtain data in the laboratory program that can be compared directly with data collected from the field tests. Graphs showing results are provided in Attachment G.

Although most of the release trends for these tests appear largely stable, it is proposed that these tests continue, principally due to their value in terms of comparisons with the data derived from the field tests.

4.2.7 Ore Composite

One sample of an ore composite is being studied. Graphs showing results are provided in Attachment H. The test has been running for just over a year and is yielding pH neutral leachate. Based on the NP of 6.9 kg $CaCO_3$/t, it is expected that acid conditions would develop over time. Some metal release rates are showing gradual increases over time, e.g. Cd, Cu and Zn. It is mainly proposed this test continue to determine if acid conditions will develop in ore grade type materials.

4.3 Subaqueous Columns

Table 4 summarizes characteristics of the samples used in each test, and gives information about the status of each test. Also given in the table are recommendations to terminate those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale. The following sections describe selected outcomes of the testwork, and give justifications for recommendations that have been made.

It should be noted that a further 12 samples are currently being stored under aerated, humid conditions ('stored bag' tests). This storage regime is intended to encourage sulphide oxidation and weathering, to

represent exposure of waste rock to aerial conditions prior to submergence for long term storage. The long term intention is for a subset of these 'weathered' samples to be studied in subaqueous columns. These columns will be included in proposals for the 2010 program of work.

4.3.1 Pebble West Zone

Six Pre-Tertiary samples are being characterized covering a range of rock types (volcano-sedimentary and plutonic). Of these six tests, two were completed in 2006 (SRK 2006). Graphs showing results are provided in Attachment I.

Of the four ongoing tests, the following comments can be made:

- Sample 3069-0927-0947 – The leachate chemistry shows some variability in pH and sulphate release and the release rate for several elements are showing increases over time, e.g. As, Sb and to a lesser extent Cu and Zn. It is proposed that this test be continued.
- Sample 3102-0568-0588 – In general, the major element chemistry appears stable. A very gradual increase in sulphate release rate is observed after 600 days which is correlated with an increase in the redox potential. It is proposed that this test be completed.
- Sample 3124-0188-0209 – This sample shows trends similar to Sample 3069-0927-0947 and has demonstrated that acidic rock placed underwater remains acidic. It is recommended that this test be completed.
- Sample 3124-0872-0887 – This sample has demonstrated stable leachate chemistry under non-acidic conditions. It is proposed this test be completed.

4.3.2 Pebble East Zone

Two Tertiary samples are being studied, one each of sedimentary and volcanic rock types. Graphs showing results are provided in Attachment J. These tests have been running less than a year, and the leachate chemistry has not yet completely stabilized. It is proposed that both tests continue.

5 Tailings Samples

5.1 Metallurgical Process Background and Geochemical Characteristics

Several phases of metallurgical testwork have been performed for Pebble Project since 2005 resulting in generation of tailings products for geochemical testing.

The proposed metallurgical process would use flotation to separate commodity sulfide minerals from the ore. Separation would occur in two stages. The first stage would float both waste and commodity sulfide minerals to a bulk sulfide concentrate resulting in a low sulfide bulk or rougher tailings product. The second stage floats commodity sulfide minerals (chalcopyrite and molybdenite) from the bulk concentrate leaving pyrite tailings. To date, testwork has focused on characterizing the bulk tailings products while gold recovery from the pyrite tailings has been evaluated.

Kinetic testing has used two sets of tailings products from metallurgical testwork in 2005 and 2008. The 2005 program used West Zone ore and was performed at the bench scale. In 2008, the metallurgical program evaluated recovery of metals from West and East Zone ore composites in a pilot plant. Processing of East Zone ores also considered rock type as a variable. In addition, the ability to generate tailings sand using cyclones was evaluated. All types of samples are being characterized in geochemical testwork

Static geochemical testwork has consistently shown that the bulk tailings product should have low sulfur content (0.1%) and sufficient NP to result in bulk tailings that have low potential for ARD. A significant difference between the zones is that NP in the East Zone is lower than West Zone

The tailings kinetic testwork program comprises mainly humidity cell tests. In addition, two column tests were undertaken using the 2005 tailings samples. The number of tests included in the program is summarized in Figure 3.

Table 5 summarizes characteristics of the samples used in each test, and gives information about the status of each test. Also given in the table are recommendations to terminate those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale. The following sections describe briefly selected outcomes of the testwork, and give justifications for recommendations that have been made.

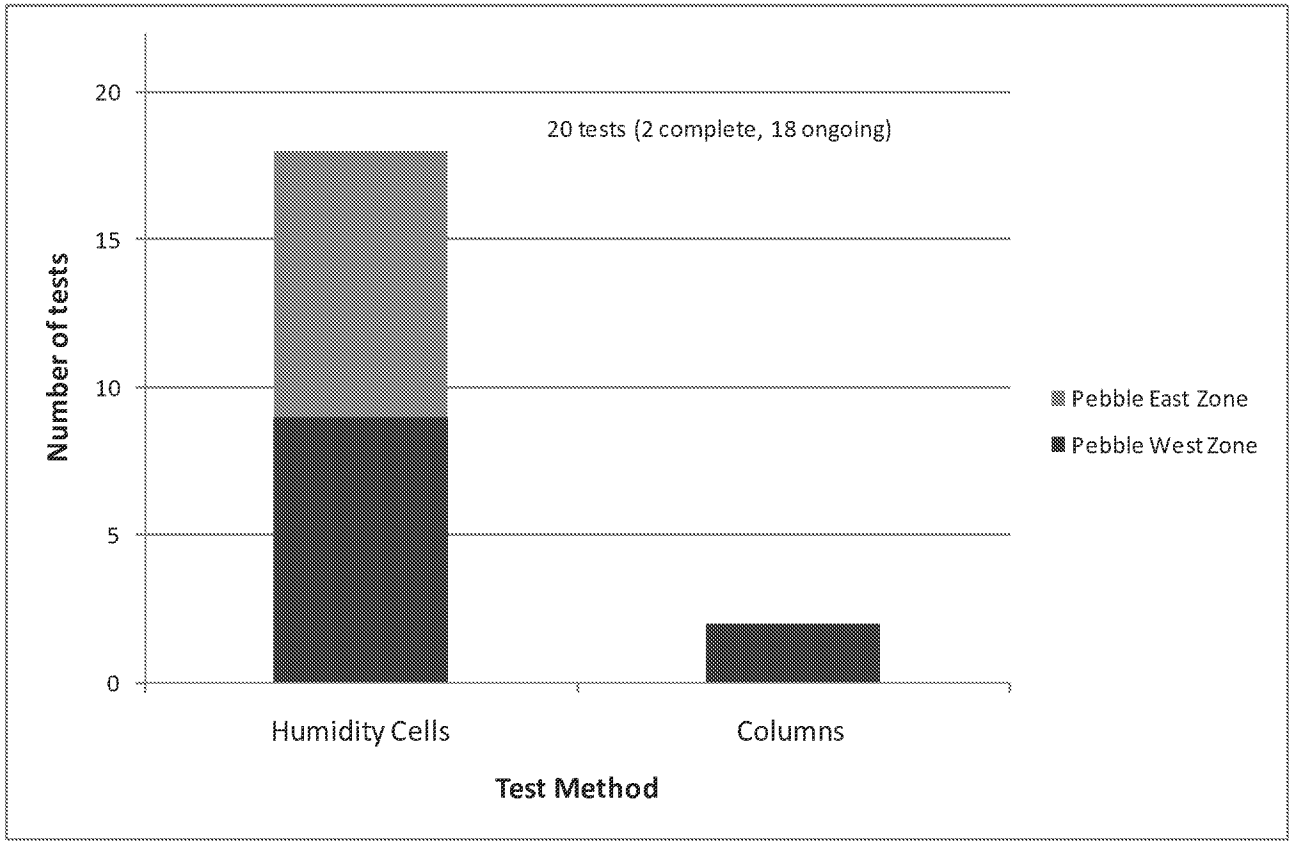

Figure 3: Summary of Tests undertaken involving Pebble Tailings

5.2 Humidity Cells

5.2.1 2005 West Zone Samples

Two samples of two types of tailings (total four samples) were provided for geochemical characterization, both tailings types are components of the bulk tailings stream. Two of the tests were completed in 2005 and two tests have been continuing for over 4 years. Graphs showing results are provided in Attachment K.

The two continuing tests are showing stable sulfate release rates. Leachate is pH neutral and release rates for many parameters either remain constant or are decreasing very gradually. It is proposed that the two remaining tests be completed because the objective of the testwork has been met.

5.2.2 2008 Samples

Fourteen samples are currently being characterized (Table 5). These can be grouped as follows:

- East Zone individual rock type composites for metasediments (Y) and intrusive (G) tested as bulk tailings, and separated sands and slimes products produced by cycloning.
- East Zone combined rock type composite (80% G and 20% Y) similarly tested as bulk, sands and slimes.
- West Zone single rock type composite (termed H for hypogene) tested as two components of the bulk tailings (cleaner and scavenger tailings) and pyrite rougher tailings from initial cleaning of the bulk sulfide concentrate. The pyrite rougher tailings are not the final pyrite tailings.

Graphs showing results are provided in Attachment L. Overall interpretation of the test data (including the 2005 tests) shows that predictable relationships exist between sulfur content and particle size after sulfate release rates stabilizes, which generally occurs less than a year into testing. For a given tailings particle size product (bulk, sands or slimes), oxidation rates are correlated with sulfur content. For a given tailings composite, oxidation rates are negatively correlated with particle size. That is, under laboratory conditions, as particle size decreases oxidation rates increases. This latter finding is consistent with oxidation as a surface area phenomenon.

Eight of the tests (East Zone Rock Type Composite and West Zone Composite) have been running for less than a year. The leachate chemistry has not yet fully stabilized in all cases and it is proposed that these tests be continued.

The six other tests (PP08 series samples) have been running for a year and generally show stable sulfate release rates correlated with bulk characteristics. Leachate is pH neutral and release rates for many parameters either remain constant or are decreasing very gradually. It is proposed that four of the tests be completed.

It is generally noted that copper shows the greatest variability in release rates regardless of relatively stable pH and oxidation rates. This is a common feature of the testwork results including the tests started in 2005 and operated for more than 4 years. The explanation for the variability is unclear but could simply be a function of the low leachate concentrations and variable interaction with the samples under slight changes in operating conditions. As this appears to be a common feature of the data, it was not used as a criterion for evaluating stability unless a distinct trend was apparent.

It is proposed that the two tests involving cyclone sands (PP08-3850 and PP08-3849) be continued due to their potential importance as a component of tailings beaches and a construction material should the project proceed with use of cyclone sands for dam building.

The proposed ongoing test program consists of:

- East and West Zone rock type composite bulk, sands and slimes tailings samples.
- Two additional sands samples for individual rock types from the East Zone.

5.2.3 2005 Tailings Samples Columns

Two of the scavenger tails samples were studied. Both tests are ongoing. Graphs showing results are provided in Attachment M.

The tests have been running for more than 4 years and the sulfate release rates are generally stable. In the case of Sample S2-Scavenger Tails, the Mo release started to increase at around 900 days, and continues to rise. It is recommended that this test be continued to evaluate the trend in molybdenum release rates. It is proposed that the S1-Scavenger Tails column be terminated.

6 Proposed Changes to Monitoring Frequency

As testwork continues, less frequent monitoring results are needed to discern trends in leachate chemistry. Table 6 provides proposes changes to the leachate analysis for all tests proposed for continuation.

Table 1: Characteristics and Status of Pebble West Zone Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Date Started	Last data	Duration Years	NP kg CaCO3/t	AP kg CaCO3/t	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1] Years	Status and Recommendation	Reasons for Previous Decision or Proposed Change
Pre-Tertiary Plutonic Rock											
026-0617-0637	D	08-Feb-05	30-Aug-05	0.6	9.8	105.3	0.09	pH < 5	-	Completed	Sulfate release trend defined under acidic conditions
046-0113-0133	N	08-Feb-05	30-Aug-05	0.6	6.1	53.4	0.11	5<pH<6	-	Completed	Stable sulfate release trend under acidic conditions
046-0580-0600	G	08-Feb-05	30-Aug-05	0.6	8.0	45.0	0.18	pH neutral	8	Completed	Stable sulfate release trend. Not expected to generate acid in short term
112-0460-0480	X	08-Feb-05	30-Aug-05	0.6	5.6	91.6	0.06	pH neutral	6	Completed	Stable sulfate release trend. Not expected to generate acid in short term
117-0190-0210	N	09-Feb-05	31-Aug-05	0.6	5.6	58.1	0.10	pH neutral	5	Completed	Stable sulfate release trend. Not expected to generate acid in short term
118-0468-0488	M	09-Feb-05	31-Aug-05	0.6	37.5	36.6	1.03	pH neutral	24	Completed	Stable sulfate release trend. Not expected to generate acid in short term
3069-0927-0947	G	09-Feb-05	Ongoing	4.2	3.2	76.3	0.04	pH < 5	-	Continue	Stable sulfate release trend under acidic conditions but continue to provide long-term data for this rock category
3123-0438-0458	D	10-Feb-05	01-Sep-05	0.6	41.8	152.5	0.27	pH neutral	39	Completed	Stable sulfate release trend. Not expected to generate acid in short term
3124-0872-0887	X	10-Feb-05	29-Jun-06	1.4	45.5	44.4	1.03	pH neutral	25	Completed	Stable sulfate release trend. Not expected to generate acid in short term
Pre-Tertiary Volcano-Sedimentary Rock											
019-0072-0090	WY	08-Feb-05	30-Aug-05	0.6	0.4	12.5	0.04	5<pH<6	-	Completed	Stable sulfate release trend under moderately acidic conditions.
033-0137-0155	Y	08-Feb-05	30-Aug-05	0.6	26.5	68.4	0.39	pH neutral	24	Completed	Stable sulfate release. Not expected to generate acid in short term
047-0350-0365	WY	08-Feb-05	27-Jun-06	1.4	6.1	104.7	0.06	pH neutral	5	Completed	Stable sulfate release trend. Not expected to generate acid in short term
118-0520-0535	Y	09-Feb-05	31-Aug-05	0.6	30.9	92.5	0.33	pH neutral	10	Completed	Stable sulfate release trend. Not expected to generate acid in short term
118-1220-1238	WY	09-Feb-05	31-Aug-05	0.6	32.6	77.5	0.42	pH neutral	15	Completed	Stable sulfate release trend. Not expected to generate acid in short term
3102-0568-0588	Y	09-Feb-05	31-Aug-05	0.6	18.5	97.8	0.19	pH neutral	11	Completed	Stable sulfate release trend. Not expected to generate acid in short term
3115-0988-1008	Y	10-Feb-05	29-Jun-06	1.4	10.6	46.3	0.22	pH neutral	10	Completed	Stable sulfate release trend. Not expected to generate acid in short term
3124-0188-0209	Y	10-Feb-05	Ongoing	4.2	0.1	77.2	0.00	pH < 5	-	Continue	Stable sulfate release trend under acidic conditions but continue to provide long-term data for this rock category
Tertiary											
115-0054-0066	TC siltstone	09-Feb-05	31-Aug-05	0.6	29.0	6.3	4.64	pH neutral		Completed	Decreasing sulfate release trend shown. Sample 115-0142-0163 was continued as an example of same rock type
115-0054-0066	TC siltstone	22-Feb-05	30-Aug-05	0.5	29.0	6.3	4.64	pH neutral		Completed	Reproducibility shown
115-0054-0066	TC siltstone	22-Feb-05	30-Aug-05	0.5	29.0	6.3	4.64	pH neutral		Completed	Reproducibility shown
115-0142-0163	TC arkose (higher S)	09-Feb-05	Ongoing	4.2	41.4	9.4	4.41	pH neutral		Complete	Stable sulfate release trend.
3129-0253-0272	TC (and/vol cng)	10-Feb-05	29-Jun-06	1.4	83.8	3.1	26.80	pH neutral		Completed	Stable sulfate release trend.
3129-0417-0435	TC (and/vol cng)	10-Feb-05	01-Sep-05	0.6	98.5	0.6	157.60	pH neutral		Completed	Release trends paralleled 3129-0253-0272 (same rock) which was continued a little longer.
4157 439-471	TF	01-Nov-05	Ongoing	3.5	21.9	116.9	0.19	pH neutral	6	Continue	Example of high S Tertiary rock. Continue to evaluate release trend.
4292 685-695	TC	01-Nov-05	Ongoing	3.5	83.7	75.3	1.11	pH neutral		Complete	Stable sulfate release trend.
117-1055-1071	TBd (low S)	09-Feb-05	31-Aug-05	0.6	108.5	7.8	13.89	pH neutral		Completed	Similar results to sample 3102-0958-0978 on same rock type.
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Stable sulfate release trend.
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Reproducibility shown
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Reproducibility shown
4292 415-430	TA/TD	01-Nov-05	Ongoing	3.5	17.2	27.2	0.63	pH neutral	11	Continue	Continue to provide long term data for this rock category.

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned. Timescales are only given in the case of samples with NP/AP < 2.

EPA-7609-0007803_00017

Table 2: Characteristics and Status of Pebble East Zone Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Started	Last data	Duration Years	NP kg CaCO3/t	AP kg CaCO3/t	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1] Years	Status and Recommendation	Reasons for Previous Decision or Proposed Change
Pre-Tertiary Plutonic Rock											
224956	D	17-Jan-06	Ongoing	1.3	25.4	65.6	0.4	pH neutral	26	Continue	Sulfate release rates decreasing
224162	G	16-Jan-08	Ongoing	1.3	2.5	24.1	0.1	5<pH<6	-	Complete	Sulfate release rates stable under mildly acidic conditions.
226293	Gp	17-Jan-08	Ongoing	1.3	31.3	16.6	1.9	pH neutral	30	Complete	Release trends parallel Sample 224956. Test for Sample 224956 will continue.
406692	Gs	15-Jan-08	Ongoing	1.3	6.4	398	0	pH<5	-	Continue	Increasing arsenic release
225026	Gs	15-Jan-08	Ongoing	1.3	7.5	30	0.3	5<pH<6	-	Continue	Increasing arsenic release
105391	Gs	16-Jan-08	Ongoing	1.3	1	452	0	pH<5	-	Continue	Increasing molybdenum release
105456	Gs	16-Jan-08	Ongoing	1.3	2.3	233	0	pH<5	-	Complete	Stable leachate chemistry under acidic conditions
Pre-Tertiary Volcano-Sedimentary Rock											
220841 + 220842	Y	15-Jan-08	Ongoing	1.3	4.9	69.7	0.1	pH<5	-	Continue	Declining pH trend with increasing metal release
406717	Y	15-Jan-08	Ongoing	1.3	7.4	395	0	pH<5	-	Complete	Stablesulfate release under acidic conditions
107326	Y	16-Jan-08	Ongoing	1.3	13.7	17.2	0.8	pH neutral	18	Complete	Release trends parallel Sample 107172. Test for Sample 107172 will continue.
107172	Y	17-Jan-08	Ongoing	1.3	5.8	37.5	0.2	pH neutral	7	Continue	Increasing tin release.
220976	Y2L	16-Jan-08	Ongoing	1.3	14.8	283	0.1	5<pH<6	-	Continue	Declining pH trend with increasing metal release
Tertiary Rock											
104472	TC	15-Jan-08	Ongoing	1.3	10.7	27.5	0.4	pH<5	-	Continue	Leachate pH decreasing and some metal release rates increasing.
406558	TC	17-Jan-08	Ongoing	1.3	62.5	47.8	1.3	pH neutral	62	Complete	Stable sulfate release trend
220394	TC	17-Jan-08	Ongoing	1.3	92.7	1.3	74.2	pH neutral		Complete	Stable sulfate release trend
219084	TF	16-Jan-08	Ongoing	1.3	106.4	1.3	85.1	pH neutral		Complete	Stable sulfate release trend
406502	TF	17-Jan-08	Ongoing	1.3	36.6	3.8	9.8	pH neutral		Complete	Stable sulfate release trend
219135	TW	15-Jan-08	Ongoing	1.3	70.4	7.5	9.4	pH neutral		Complete	Stable sulfate release trend
220364	TY	15-Jan-08	Ongoing	1.3	60.8	4.1	15	pH neutral		Complete	Stable sulfate release trend
219189	TY	17-Jan-08	Ongoing	1.3	51.5	4.7	11	pH neutral		Complete	Stable sulfate release trend
220366	TY	20-Nov-08	Ongoing	0.4	8.1	56.3	0.1	pH<5	-	Continue	Operated for less than a year. Leachate pH not stable
222788	TA d	16-Jan-08	Ongoing	1.3	34.6	79.7	0.4	pH neutral	33	Complete	Stable sulfate release trend
226785	TB	16-Jan-08	Ongoing	1.3	83.3	53.8	1.5	pH neutral	66	Complete	Stable sulfate release trend
104775	TD	15-Jan-08	Ongoing	1.3	14	0.9	14.9	pH neutral		Complete	Stable sulfate release trend
221502	TD	20-Nov-08	Ongoing	0.4	28.2	47.8	0.6	5<pH<6	-	Continue	Operated for less than a year. Leachate pH not stable
Ore Composite											
11486-001 AT COMP – 10m	Ore composite	9-Apr-08	Ongoing	1.0			0.09	pH neutral	13	Continue	Continue as only sample of this type being studied.

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned. Timescales are only given in the case of samples with NP/AP < 2.

Table 3: Characteristics and Status of Field Barrel Test Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Started	Last data	Duration	NP	AP	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1]	Status and Recommendation	Reasons for Previous Decision or Proposed Change
				Years	kg $CaCO_3$/t	kg $CaCO_3$/t			years		
ARLB003	G/D/N	18-Jan-08	Ongoing	1.3	26.90	183.44	0.16	pH neutral	12.40	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB006	G/D/N	18-Jan-08	Ongoing	1.3	21.30	100.00	0.21	pH neutral	11.72	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB001	Y	18-Jan-08	Ongoing	1.3	6.50	198.44	0.03	pH<5	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB002	Y	18-Jan-08	Ongoing	1.3	6.20	189.06	0.03	pH<5	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB007	TC/TF	18-Jan-08	Ongoing	1.3	90.20	22.19	4.07	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB008	TC/TF	18-Jan-08	Ongoing	1.3	70.10	6.56	10.68	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB004	TW	18-Jan-08	Ongoing	1.3	67.20	5.31	12.65	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB005	TY	18-Jan-08	Ongoing	1.3	63.40	15.00	4.23	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB009	TD	18-Jan-08	Ongoing	1.3	44.60	5.00	8.96	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB010	TA+TB	18-Jan-08	Ongoing	1.3	48.10	1.56	30.78	pH neutral	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned. Timescales are only given in the case of samples with NP/AP < 2.

Table 4: Characteristics and Status of Waste Rock Samples in Subaqueous Columns

Sample ID	Rock Type	Zone	Started	Last data	Duration	NP	AP	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1]	Status and Recommendation	Reasons for Previous Decision or Proposed Change
					Years	kg $CaCO_3$/t	kg $CaCO_3$/t			Years		
3069-0927-0947	G	PWZ	26-Sep-05	Ongoing	3.6	3.2	76.3	0.04	pH<5	-	Continue	pH declining and As release rate increasing
3102-0568-0588	Y	PWZ	26-Sep-05	Ongoing	3.6	18.5	97.8	0.19	pH neutral	-	Complete	Stable leachate chemistry at near neutral pH.
3115-0988-1008	Y	PWZ	26-Sep-05	26-Jun-06	0.7	10.0	46.3	0.22	pH neutral	-	Completed	Stable leachate chemistry achieved following initial flushing of pre-test oxidation products.
3123-0438-0458	D	PWZ	26-Sep-05	26-Jun-06	0.7	41.8	152.5	0.27	pH neutral	-	Completed	Low levels of leaching shown under subaqueous conditions. Other tests (3102-0568-0588 evaluated longer term effects.
3124-0188-0209	Y	PWZ	28-Sep-05	Ongoing	3.6	0.1	77.2	0.00	pH<5	-	Complete	Demonstrated that acidic rock remains acidic, 3069-0927-0947 provides evaluation of similar effects.
3124-0872-0887	X	PWZ	26-Oct-05	Ongoing	3.5	45.5	44.4	1.03	pH neutral	-	Complete	Stable leachate chemistry under non-acidic conditions demonstrated.
Composite13	TC	PEZ	10-Aug-08	Ongoing	0.7	80.7	6.3	12.91	pH neutral	-	Continue	Less than 1 year of data available
Composite19	TA	PEZ	10-Aug-08	Ongoing	0.7	17.5	17.5	1.00	pH neutral	-	Continue	Less than 1 year of data available

[1] Onset of acid conditions is not shown because interpretation is required in the context of site conditions to make this determination

Note: A further 12 PEZ samples are currently being stored under aerated, humid conditions ('stored bag' tests). The long term intention is for a subset of these 'weathered' samples to be studied in subaqueous columns.

Table 5: Characteristics and Status of Tailings Samples in Humidity Cell Tests and Columns

Sample ID	Tails Type	Zone	Started	Last data	Duration Years	NP kg $CaCO_3$/t	AP kg $CaCO_3$/t	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1] Years	Status and Recommendation	Reasons for Previous Decision or Proposed Change
Humidity Cell Tests (2005 Tails Samples)												
S2-Scavenger Tails		PWZ	11-Feb-05	07-Oct-05	0.7	24.4	5.3	4.6	pH neutral	-	Completed	Stable sulfate release rate
S2-Bulk Cleaner Tails		PWZ	11-Feb-05	Ongoing	4.2	23.3	9.7	2.4	pH neutral	-	Complete	Stable sulfate release rate.
S1-Scavenger Tails		PWZ	11-Feb-05	07-Oct-05	0.7	19.9	4.7	4.2	pH neutral	-	Completed	Stable sulfate release rate
S1-Bulk Cleaner Tails		PWZ	11-Feb-05	Ongoing	4.2	19.6	6.9	2.9	pH neutral	-	Complete	Stable sulfate release rate
Humidity Cell Tests (2008 Tails Samples)												
PP08-3365	Y - bulk tails	PEZ	23-Apr-08	Ongoing	1.0	4.6	6.6	0.7	pH neutral	0.0	Complete	Stable sulfate release rate
PP08-3607	Y - bulk tails (cyclone slimes)	PEZ	23-Apr-08	Ongoing	1.0	5.7	4.7	1.2	pH neutral	0.1	Complete	Stable sulfate release rate
PP08-3850	Y - bulk tails (cyclone sands)	PEZ	23-Apr-08	Ongoing	1.0	6.3	8.4	0.7	pH neutral	0.6	Continue	To obtain long term data for this tailings type which would form tailings beaches
PP08-3614	G - bulk tails	PEZ	23-Apr-08	Ongoing	1.0	5.7	2.8	2.0	pH neutral	-	Complete	Stable sulfate release rate
PP08-3610	G - bulk tails (cyclone slimes)	PEZ	23-Apr-08	Ongoing	1.0	6.3	1.6	4.0	pH neutral	-	Complete	Stable sulfate release rate
PP08-3649	G - bulk tails (cyclone sands)	PEZ	23-Apr-08	Ongoing	1.0	6.2	3.1	2.0	pH neutral	-	Continue	To obtain long term data for this tailings type which would form tailings beaches
11486-003 bulk	G+Y bulk tails	PEZ	22-Oct-08	Ongoing	0.5	7.2	3.4	2.1	pH neutral	-	Continue	Less than 1 year of data available. Trends not fully stable
11486-003 OF	80G+20Y – Cyclone O/F (slimes)	PEZ	22-Oct-08	Ongoing	0.5	8.3	3.4	2.4	pH neutral	-	Continue	Less than 1 year of data available. Trends not fully stable
11486-003 UF	80G+20Y – Cyclone U/F (sands)	PEZ	22-Oct-08	Ongoing	0.5	7.0	6.3	1.1	pH neutral	1.2	Continue	Less than 1 year of data available. Trends not fully stable
11840-003 bulk cleaner	H-Bulk Cleaner Tails	PWZ	13-Aug-08	Ongoing	0.7	17.7	23.4	0.8	pH neutral	4.8	Continue	Less than 1 year of data available. Trends not fully stable
11840-003 pyrite	H - Pyrite Rougher Tails	PWZ	10-Sep-08	Ongoing	0.6	23.0	38.8	0.6	pH neutral	1.1	Continue	Less than 1 year of data available.
11840-003 bulk float	H - Bulk Tails (Bulk Scavenger Tails) as is	PWZ	10-Sep-08	Ongoing	0.6	22.3	4.4	5.1	pH neutral	-	Continue	Less than 1 year of data available.
11840-003 Phase II sands	H - Bulk Tails (Bulk Scavenger Tails) Cyclone Sands	PWZ	10-Sep-08	Ongoing	0.6	21.1	7.8	2.7	pH neutral	-	Continue	Less than 1 year of data available.
11840-003 Phase II OF	H - Bulk Tails (Bulk Scavenger Tails) Cyclone Slimes	PWZ	10-Sep-08	Ongoing	0.6	25.2	2.8	9.0	pH neutral	-	Continue	Less than 1 year of data available.
Columns (2005 Tails Samples)												
S2-Scavenger Tails		PWZ	11-Feb-05	Ongoing	4.2	24.4	5.3	4.6	pH neutral	-	Continue	Evaluate increasing Mo release rate.
S1-Scavenger Tails		PWZ	11-Feb-05	Ongoing	4.2	19.9	4.7	4.2	pH neutral	-	Complete	Stable chemistry.

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned. Timescales are only given in the case of samples with NP/AP < 2.

Table 6: Proposed Changes to Monitoring Frequency for Ongoing Tests

Parameter Group	Early Stage Frequency	Ongoing Frequency
Leachate recovery	Weekly	Weekly
pH, ORP, Conductivity	Weekly	Every other week
Acidity, alkalinity, TDS, Hardness, Chloride, Fluoride, Sulphate	Every other week	Every fourth week
Element Scan	Every other week	Every fourth week

Attachment A

Graphs for Pre-Tertiary Volcano-Sedimentary Rock Humidity Cells (Pebble West Zone)

SOA 086494

Attachment B

Graphs for Pre-Tertiary Plutonic Rock Humidity Cells (Pebble West Zone)

SOA 086495

Attachment C

Graphs for Tertiary Rock Humidity Cells (Pebble West Zone)

SOA 086496

Attachment D

Graphs for Pre-Tertiary Volcano-Sedimentary Rock Humidity Cells (Pebble East Zone)

SOA 086497

Attachment E

Graphs for Pre-Tertiary Plutonic Rock Humidity Cells (Pebble East Zone)

SOA 086498

Attachment F

Graphs for Tertiary Rock Humidity Cells
(Pebble East Zone)

SOA 086499

Attachment G

Graphs for Humidity Cell Tests involving Barrel Test Samples

SOA 086500

Attachment H

Graphs for Humidity Cell Tests involving Ore Composite Sample

SOA 086501

Attachment I

Graphs for Subaqueous Rock Columns
(Pre-Tertiary, Pebble West Zone)

SOA 086502

Attachment J

Graphs for Subaqueous Rock Columns
(Tertiary, Pebble East Zone)

SOA 086503

Attachment K

Graphs for Tailings Humidity Cells (2005 Samples)

SOA 086504

Attachment L

Graphs for Tailings Humidity Cells (2008 Samples)

SOA 086505

Attachment M

Graphs for Tailings Column Tests (2005 Samples)

SOA 086506

Attachment N
Response to ADNR and ADEC Comments

SOA 086507

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Memo

To:	Jane Whitsett, Pebble Limited Partnership	**Date:**	May 21, 2009
cc:		**From:**	Claire Linklater Stephen Day
Subject:	Status of Kinetic Test Program and Proposed Modifications Pebble Project DRAFT	**Project #:**	1CN007.000

1 Executive Summary

Development of the Pebble Deposit could involve excavation of waste rock showing a range of potential for metal leaching (ML) and acid rock drainage (ARD). The mineralized rock associated with the ore body is generally classified as potentially ARD generating whereas overlying rocks deposited after the mineralizing event are generally classified as having low potential for ARD but with some "metal" leaching considerations.

Two types of tailings would be produced by processing Pebble Project ores. The major tailings stream would have low potential for ARD due to relatively low sulfide content. A second smaller stream is classified as potentially ARD generating due to its elevated sulfide content.

To evaluate actual leaching, an extensive kinetic test program was implemented in 2005 on rock and tailings samples. As the overall project has evolved, additional tests have been started on waste rock and tailings. In total, 68 rock and 18 tailings samples have been, or continue to be tested (some for more than 4 years).

Based on recent review of the data obtained, modifications to the test program are being proposed to recognize that some tests have satisfied their objectives by yielding stable leachate chemistry under non-acidic or acidic conditions. In these tests, the leachate chemistry is not expected to change for several years. The data can be used to develop geochemical criteria for waste management and to predict water quality.

The following table summarizes the overall program and the proposed modification to the program to allow for tests for which the objectives have been met and the test can be completed.

Test Material	Total Number of Tests	Tests Already Completed	Test Proposed to be Completed	Proposed Ongoing Tests
Rock	74	23	23	28
Tailings	20	2	7	11

For ongoing tests, it is proposed to reduce monitoring frequency because long term trends can be defined by less frequent analysis of leachates. Most parameters would be reduced from analysis every other week to analysis every fourth week.

2 Introduction

2.1 Background

To support mine planning for the Pebble Project, a detailed environmental geochemical characterization program is ongoing focused on materials that may constitute wastes generated by the mine.

The aims of the program are to:

- Geochemically characterize materials that could be produced during mining and milling and determine their likely geochemical behavior following disturbance by mining activities;
- Provide data that can be used to make decisions about waste management approaches; and
- Obtain information that can be used to estimate the chemistry of water in contact with these materials.

The program commenced in 2004 and since then a large body of data have been obtained. Although a large proportion of the planned testwork is complete, a number of longer term kinetic weathering tests are ongoing (humidity cells, subaqueous columns and field barrel tests).

Kinetic tests provide specific data to answer the questions of whether rock/tailings could generate acid rock drainage (ARD) (depending on how the material is managed), when ARD would be generated, and how rates of leaching are related to factors such as mineralogy, sulfur, metal content, leachate chemistry and disposal conditions. Each test provides information on these aspects and is usually continued until the test results no longer add significant new information to the understanding of the metal leaching and ARD (ML/ARD) aspects of the project.

Thorough review of the test data has occurred at various times and decisions made to finish or continue tests as a result of trends in leachate chemistry. The duration of tests at completion is determined by the timing of these reviews and the date the tests started. There is no correlation of the actual termination date with short term effects observed in leachate chemistry trends.

The kinetic testwork program includes both laboratory and field tests. This memorandum describes:

- the status of the laboratory-based component of the kinetic testwork program at the current time and makes recommendations for completion of a number of the tests; and
- proposes reduction in monitoring frequency.

The program includes study of waste rock and tailings and these are discussed in turn in the later sections.

2.2 Geological Terminology and Overall Geochemical Characteristics

The geological setting will not be described in detail here. The main geological features of the Pebble Deposit are (1) porphyry mineralized Cretaceous (Pre-Tertiary) age sedimentary and intrusive rocks containing the copper, gold and molybdenum mineralization; and (2) overlying Tertiary age sedimentary, volcano-sedimentary and sedimentary rocks deposited on the eroded Cretaceous rocks. The Tertiary rocks do not contain porphyry mineralization though are locally mineralized with iron sulfides.

Static geochemical characterization to date has determined that the Pre-Tertiary rocks have potential to generate ARD if not managed appropriately. In contrast, the Tertiary rocks have low potential for ARD due to generally low levels of iron sulfide minerals and relatively abundant acid neutralizing carbonate minerals.

The porphyry- mineralized pre-Tertiary rocks are described as being part of the West and East Zones which are distinctive mineralizing centers. The West Zone was discovered and tested first. The overlying Tertiary rocks are also assigned to the same zones but are continuous and unrelated to the pre-Tertiary zones. The geochemical characteristics for the zones are not significantly different in the context of the overall objectives of the geochemical characterization program.

2.3 Supporting Documents

The design of the geochemical characterization program for the Pebble Project has been described in several previous document the most comprehensive of which is "Pebble Project – Metal Leaching/Acid Rock Drainage Characterization - DRAFT Sampling and Analysis Plan" (June 2005).

The memorandum "Status of Kinetic Tests - Pebble Project" (November 22, 2006) (SRK 2006) previously described the status of the testwork and was provided to ADNR. Summaries of the kinetic test program have been provided as part of annual meetings with State of Alaska and Federal agency staff.

3 Waste Rock Samples

3.1 Introduction

The laboratory program includes both humidity cell tests and subaqueous columns to examine reaction kinetics under unsaturated conditions and under flooded conditions, respectively. The overall number of tests in program classified according to age (Tertiary and Pre-Tertiary), rock type (plutonic, sedimentary, volcanic) and zone (West and East) are summarized in Figures 1 and 2.

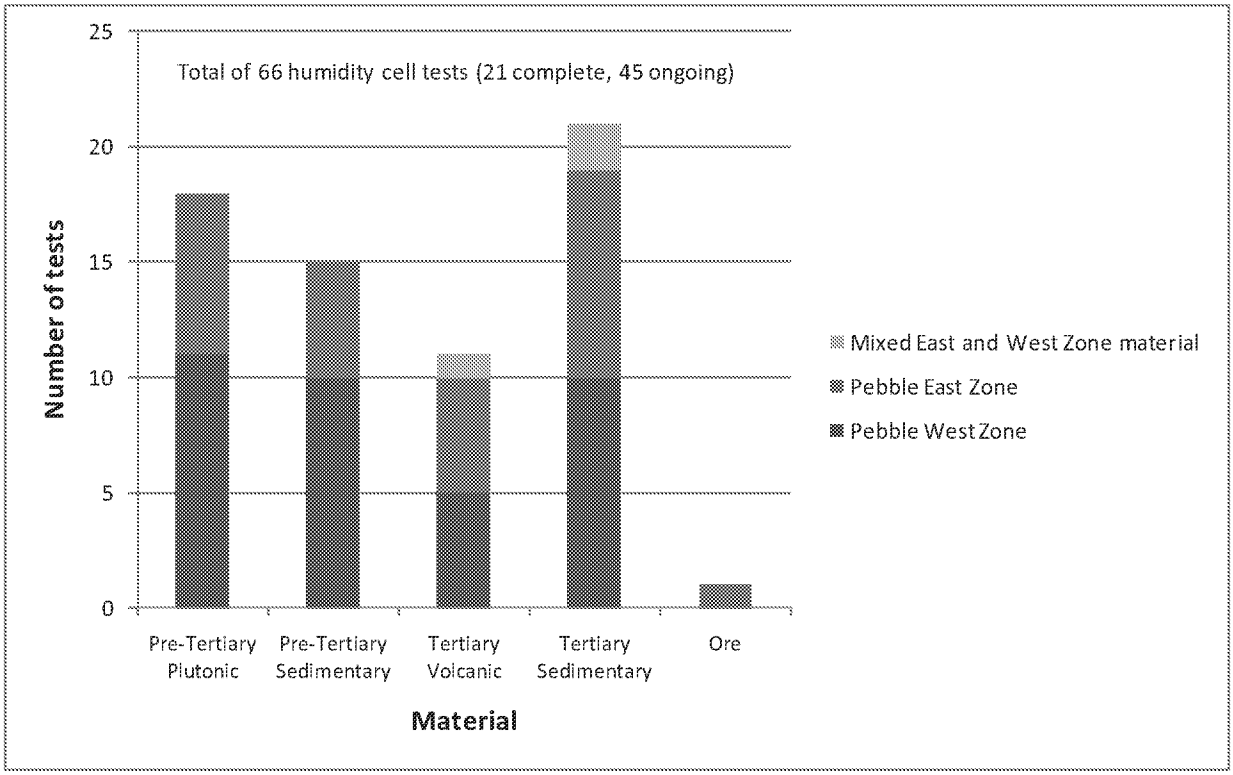

Figure 1: Summary of Number of Rock Humidity Cells

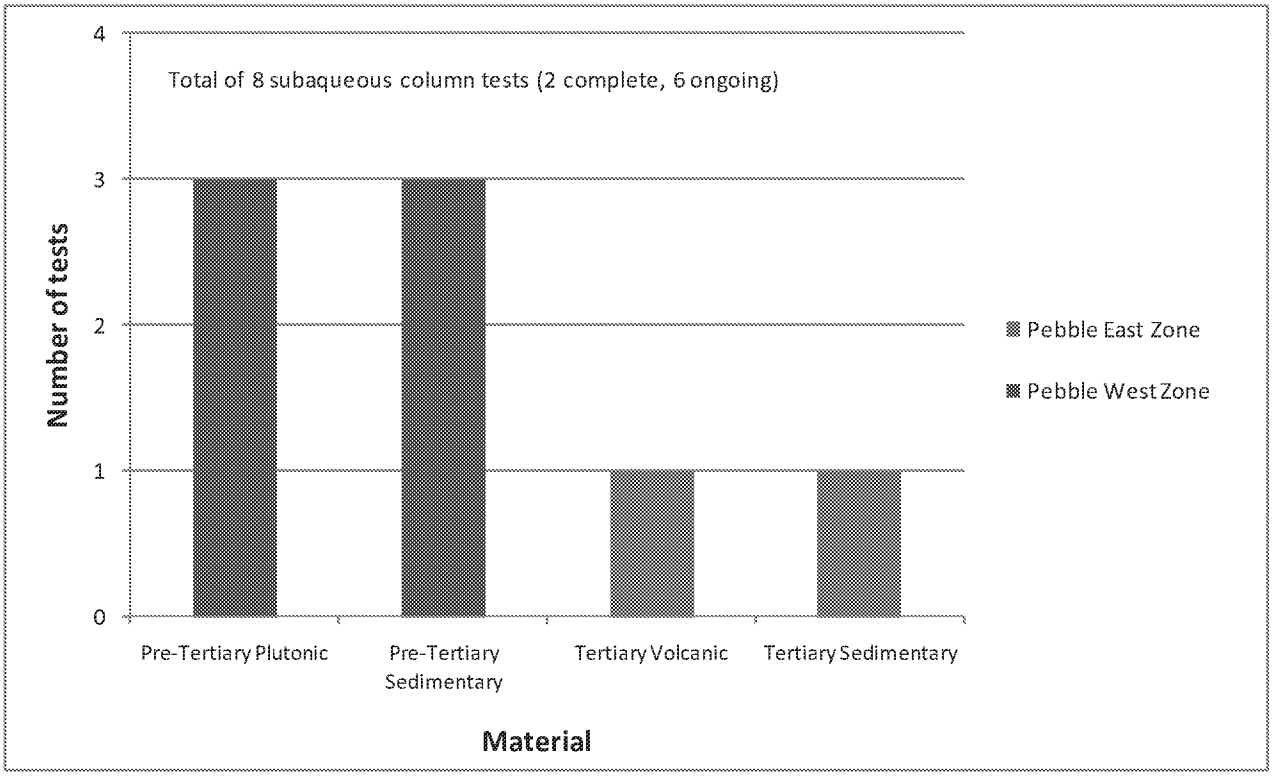

Figure 2: Number of Subaqueous Columns

3.2 Humidity Cells

Tables 1 to 3 summarize characteristics of the samples used in each test, and give information about the status of each test. Also given in the tables are recommendations to complete those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale. The following sections describe briefly selected outcomes of the testwork, and give justifications for recommended changes to the program.

3.2.1 Pebble West Zone: Pre-Tertiary

As summarized in Section 1.2, Pre-Tertiary rock generally has the potential to generate ARD. However, the rock contains a range of neutralization potentials (NP) resulting in the delay to appearance of ARD spanning decades. Samples for testing were deliberately selected to evaluate both the development of acidic conditions and leaching effects under non-acidic conditions.

Two categories of rock are being characterized:

- Volcano-sedimentary - Eight samples of wacke (W) and mudstone/siltstone (Y) were tested. Seven tests were completed in 2005 (as described by SRK 2006) because they had either generated acid or were not expected to generate acid for many years. One test (Sample 3124-0188-0209) is ongoing (over 4 years of testing). Graphs showing results are provided in Attachment A.
- Plutonic - Nine samples of plutonic igneous rocks were tested. Eight tests were completed in 2005 (SRK 2006) for the same reason indicated above. One test (Sample 3069-0927-0947) is ongoing (over 4 years of testing). Graphs showing results are provided in Attachment B.

The two ongoing samples are showing stable leachate chemistry under acidic conditions.

The objectives of these tests have been met. They have demonstrated that samples with relatively low NP (<10 kg $CaCO_3$/t) have the potential to generate acid, either immediately, or following relatively short test durations. Samples with higher NP produced pH neutral leachate. Rates of oxidation have been shown to correlate with sulfur content of the rocks. Stable metal release rates have now been collected for a range of pH conditions, sample types and bulk chemistries.

It is proposed that the two ongoing tests are continued to provide long-term data under acidic conditions for one sample from each rock type category.

3.2.2 Pebble West Zone: Tertiary

Nine Pebble West Zone Tertiary rock samples have been or continue to be tested, with two samples being tested as triplicates to assess reproducibility of results (total of 13 tests). Of these thirteen tests, six have already been completed (as described in SRK 2006) and seven are ongoing now for over 3 years. Graphs showing results are provided in Attachment C.

The majority of Tertiary rock types are not expected to generate acid. A very small component contains elevated pyrite concentrations and may generate acid. Two samples in this category are being tested. The program is designed primarily to assess element leaching under non-acidic conditions and relationships between sulfide content and element leaching.

Most samples now show stable leachate chemistry enabling leaching rates to be compared to bulk rock characteristics. Therefore, the objectives of the tests have been met. All samples have generated

leachates that were pH neutral or slightly alkaline. Release rates for the majority of parameters are either stable or gradually decreasing with time. The exceptions are:

- Sample 4157 439-471 (sedimentary rock type, TF). This sample has AP of 117 kg $CaCO_3$/t compared to typical values an order of magnitude lower and consequently elevated sulfate release compared to other samples. The leachate pH remains neutral because the sample has significant NP. The sulfate release rate appears to be increasing very gradually over time. The fluorine release rate for this sample is also rising.

- Sample 4292 415-430 (volcanic rock type, TA/TD) – The fluorine release rate for this sample is rising.

Both these samples have NP/AP less than 1 indicating a possibility that acid conditions could develop over the very long term (6 to 11 years based on the current rates of depletion of NP). It is proposed that these two tests remain in place to allow fluorine and sulphate release rates to stabilize. They also provide a possible opportunity to observe acidic conditions for Tertiary waste rock, should such conditions arise.

All other samples studies have lower ARD potential based NP/APs mostly well above 1 and also have lower APs. Acidic conditions are not expected to develop. It is proposed that all ongoing tests in this category be completed after being tested for 3 to 4 years. These tests are:

- Sample 115-0142-0163 (sedimentary rock type, TC) - This sample was tested in triplicate. Reproducibility of the triplicate was very good. Given that reproducibility has been demonstrated and the leachate chemistry is stable the objectives of the tests have been met.

- Sample 4292 685-695 (sedimentary rock type, TC) – The leachate chemistry is stable.

- 3102-0958-0978 (volcanic rock type, TB) - The leachate chemistry is stable.

3.2.3 Pebble East Zone: Pre-Tertiary

As was the case with the Pebble West zone samples, the same two categories of rock are being characterized:

- Volcano-sedimentary – Five samples are being characterized, all from the most abundant lithology, meta-mudstone (Y). Graphs showing results are provided in Attachment D.

- Plutonic - Seven samples are being tested, six from the volumetrically abundant granodiorite lithology, and one diorite sample. Graphs showing results are provided in Attachment E.

The samples are showing similar trends to those shown by the Pebble West Zone samples. For example, samples with relatively low NP (less than 10 kg $CaCO_3$/t) have been demonstrated to generate acid, either immediately, or following relatively short test durations. Samples with higher NP are associated with neutral pH leachate.

After detailed examination of the trends that have developed, it is proposed that the following five tests be completed after over a year of testing:

Volcano-sedimentary samples

- Sample 406717 – Acidic conditions have developed in this test as would be expected on the basis of the NP/AP. The leachate chemistry for this sample is stable and so the objective of the test has been met.
- Sample 107326 – This sample is showing trends very similar to Sample 107172 (neutral pH leachate, rising Mo release rates). It is proposed that this test be completed, while the test involving the comparable Sample 107172 is continued.

Plutonic samples

- Sample 224182 – Mildly acidic conditions have developed in this test as would be expected on the basis of the NP/AP ratio. The leachate chemistry for this sample is stable and so the objective of the test has been met.
- Sample 226293 – The sample has NP/AP>1 and is giving pH neutral leachate as expected. Most metal release rates are stable, although Mo release is decreasing gradually, and Sn release is increasing. Sample 224956 is showing very similar trends. It is proposed that the test involving Sample 226293 be terminated, whilst the test involving Sample 224956 continue.
- Sample 105456 - Acidic conditions have developed in this test as would be expected on the basis of the limited NP, and NP/AP<1. The leachate chemistry for this sample is stable and so the objective of the test has been met.

Seven tests will continue because leachate chemistry under non-acidic and acidic conditions has not stabilized.

3.2.4 Pebble East Zone: Tertiary

Thirteen Pebble East Zone samples are being tested. Graphs showing results are provided in Attachment F. As was the case with the Pebble West zone samples, the majority of these samples were not expected to generate acid. Most tests now show stable leachate chemistry; therefore, the objectives of the tests have been met. All samples have generated leachates that were pH neutral or slightly alkaline as expected from their bulk characteristics. Release rates for the majority of parameters are either stable or gradually decreasing with time.

It is proposed that most of these tests be completed following over a year of testing as the objectives of the tests have been met. Exceptions are the following tests, which should continue:

- Samples 220366 and Sample 221502 - These tests were started in November 2008 to provide additional coverage of the range of NP/AP in the Tertiary rocks types. The leachate chemistry does not yet appear to have stabilized and pHs are below 6.
- Sample 104772 – The leachate pH is near 5 and slightly below the pH of deioinized water in the test. The pH is gradually decreasing with time and accompanied by coincident increase in metal release rates. This sample shows the highest release rates for some metals, e.g. Cd, Cu and Zn.

3.2.5 Barrel Tests Samples

Ten samples (four Pre-Tertiary and six Tertiary) are being characterized in field (barrel) tests and equivalent humidity cell tests. They provide an opportunity to obtain data in the laboratory program that

can be compared directly with data collected from the field tests. Graphs showing results are provided in Attachment G.

Although most of the release trends for these tests appear largely stable, it is proposed that these tests continue, principally due to their value in terms of comparisons with the data derived from the field tests.

3.2.6 Ore Composite

One sample of an ore composite is being studied. Graphs showing results are provided in Attachment H. The test has been running for just over a year and is yielding pH neutral leachate. Based on the NP of 6.9 kg $CaCO_3$/t, it is expected that acid conditions would develop over time. Some metal release rates are showing gradual increases over time, e.g. Cd, Cu and Zn. It is proposed this test continue to determine if acid conditions will develop, and allow the metal release rates to stabilize.

3.3 Subaqueous Columns

These tests are intended to simulate weathering of rock in subaqueous rather than aerated conditions as would occur when waste rock or mine surfaces are flooded. Table 4 summarizes characteristics of the samples used in each test, and gives information about the status of each test. Also given in the table are recommendations to terminate those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale. The following sections describe selected outcomes of the testwork, and give justifications for recommendations that have been made.

It should be noted that a further 12 samples are currently being stored under aerated, humid conditions ('stored bag' tests). This storage regime is intended to encourage sulphide oxidation and weathering, to represent exposure of waste rock to aerial conditions prior to submergence for long term storage. The long term intention is for a subset of these 'weathered' samples to be studied in subaqueous columns. These columns will be included in proposals for the 2010 program of work.

3.3.1 Pebble West Zone

Six Pre-Tertiary samples are being characterized covering a range of rock types (volcano-sedimentary and plutonic). Of these six tests, two were completed in 2006 (SRK 2006). Graphs showing results are provided in Attachment I.

Of the four ongoing tests, the following comments can be made:

- Sample 3069-0927-0947 – The leachate chemistry shows some variability in pH and sulphate release and the release rate for several elements are showing increases over time, e.g. As, Sb and to a lesser extent Cu and Zn. It is proposed that this test be continued.
- Sample 3102-0568-0588 – The leachate chemistry appears stable. A very gradual increase in sulphate release rate is observed after 600 days which is correlated with an increase in the redox potential. It is proposed that this test be completed.
- Sample 3124-0188-0209 – This sample shows trends similar to Sample 3069-0927-0947, although the metal release rates appear more stable. It is recommended that this test be completed.
- Sample 3124-0872-0887 – This sample shows stable leachate chemistry. It is proposed this test be completed.

3.3.2 Pebble East Zone

Two Tertiary samples are being studied, one each of sedimentary and volcanic rock types. Graphs showing results are provided in Attachment J. These tests have been running less than a year, and the leachate chemistry has not yet stabilized. It is proposed that both tests continue.

4 Tailings Samples

4.1 Metallurgical Process Background and Geochemical Characteristics

Several phases of metallurgical testwork have been performed for Pebble Project since 2005 resulting in generation of tailings products for geochemical testing.

The proposed metallurgical process would use flotation to separate commodity sulfide minerals from the ore. Separation would occur in two stages. The first stage would float both waste and commodity sulfide minerals to a bulk sulfide concentrate resulting in a low sulfide bulk or rougher tailings product. The second stage floats commodity sulfide minerals (chalcopyrite and molybdenite) from the bulk concentrate leaving pyrite tailings. To date, testwork has focused on characterizing the bulk tailings products while gold recovery from the pyrite tailings has been evaluated.

Kinetic testing has used two sets of tailings products from metallurgical testwork in 2005 and 2008. The 2005 program used West Zone ore and was performed at the bench scale. In 2008, the metallurgical program evaluated recovery of metals from West and East Zone ore composites in a pilot plant. Processing of East Zone ores also considered rock type as a variable. In addition, the ability to generate tailings sand using cyclones was evaluated. All types of samples are being characterized in geochemical testwork

Static geochemical testwork has consistently shown that the bulk tailings product should have low sulfur content (0.1%) and sufficient NP to result in bulk tailings that have low potential for ARD. A significant difference between the zones is that NP in the East Zone is lower than West Zone

The tailings kinetic testwork program comprises mainly humidity cell tests. In addition, two column tests were undertaken using the 2005 tailings samples. The number of tests included in the program is summarized in Figure 3.

Table 5 summarizes characteristics of the samples used in each test, and gives information about the status of each test. Also given in the table are recommendations to terminate those tests that are showing stable trends and are not expected to yield new information on a reasonable laboratory timescale. The following sections describe briefly selected outcomes of the testwork, and give justifications for recommendations that have been made.

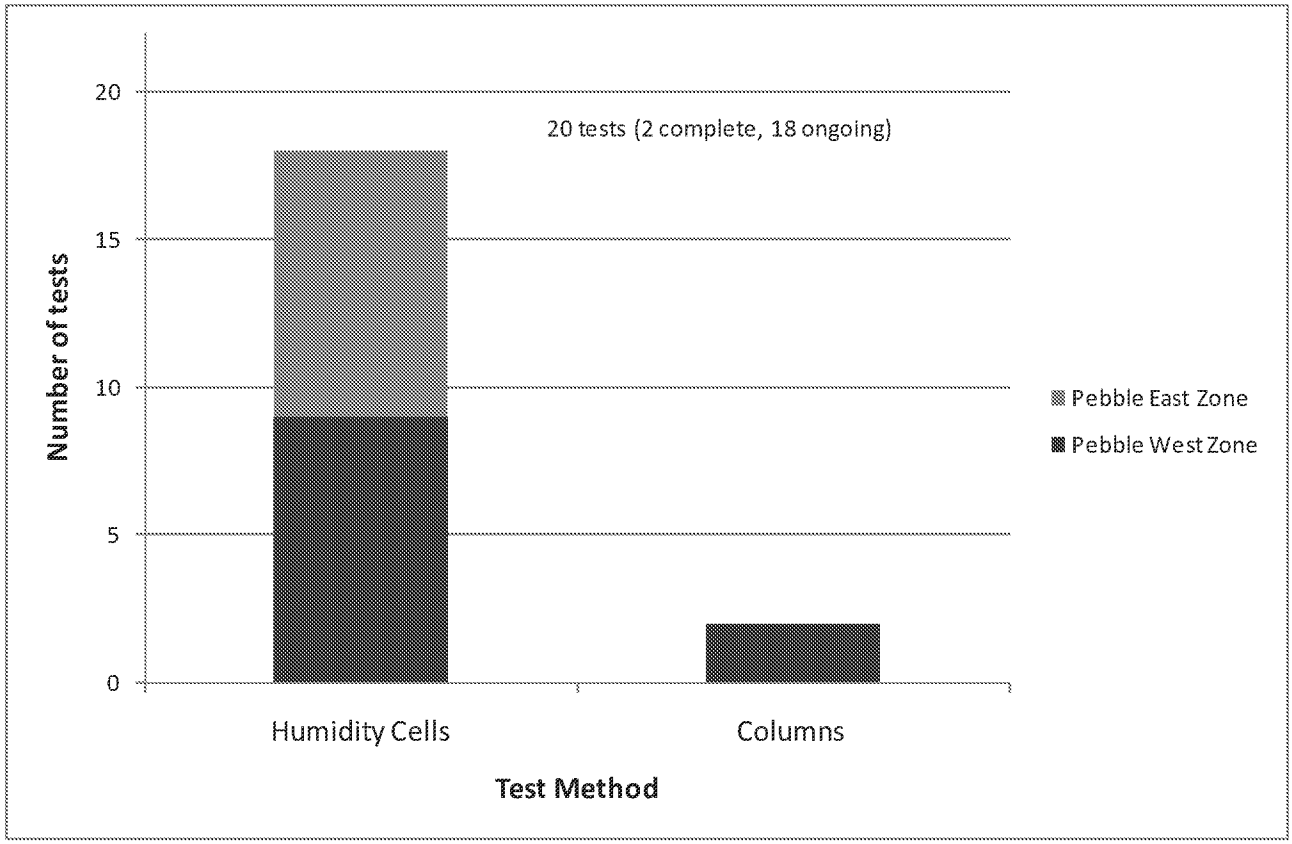

Figure 3: Summary of Tests undertaken involving Pebble Tailings

4.2 Humidity Cells

4.2.1 2005 West Zone Samples

Two samples of two types of tailings (total four samples) were provided for geochemical characterization, both tailings types are components of the bulk tailings stream. Two of the tests were completed in 2005 and two tests have been continuing for over 4 years. Graphs showing results are provided in Attachment K.

The two continuing tests are showing stable leachate chemistry. Leachate is pH neutral and release rates either remain constant or are decreasing very gradually. It is proposed that the two remaining tests be completed because the objective of the testwork has been met.

4.2.2 2008 Samples

Fourteen samples are currently being characterized (Table 5). These can be grouped as follows:

- East Zone individual rock type composites for metasediments (Y) and intrusive (G) tested as bulk tailings, and separated sands and slimes products produced by cycloning.
- East Zone combined rock type composite (80% G and 20% Y) similarly tested as bulk, sands and slimes.

- West Zone single rock type composite (termed H for hypogene) tested as two components of the bulk tailings (cleaner and scavenger tailings) and pyrite rougher tailings from initial cleaning of the bulk sulfide concentrate. The pyrite rougher tailings are not the final pyrite tailings.

Graphs showing results are provided in Attachment L. Overall interpretation of the test data (including the 2005 tests) shows that predictable relationships exist between sulfur content and particle size after leachate chemistry stabilizes, which generally occurs less than a year into testing. For a given tailings particle size product (bulk, sands or slimes), oxidation rates are correlated with sulfur content. For a given tailings composite, oxidation rates are negatively correlated with particle size. That is, under laboratory conditions, as particle size decreases oxidation rates increases. This latter finding is consistent with oxidation as a surface area phenomenon.

Eight of the tests (East Zone Rock Type Composite and West Zone Composite) have been running for less than a year. The leachate chemistry has not yet stablized and it is proposed that these tests be continued.

The six other tests (PP08 series samples) have been running for a year and generally show stable leachate chemistry correlated with bulk characteristics. Leachate is pH neutral and release rates either remain constant or are decreasing very gradually. It is proposed that four of the tests be completed.

It is proposed that the two tests involving cyclone sands (PP08-3850 and PP08-3849) be continued due to their potential importance as a component of tailings beaches and a construction material should the project proceed with use of cyclone sands for dam building.

The proposed ongoing test program consists of:

- East and West Zone rock type composite bulk, sands and slimes tailings samples.
- Two additional sands samples for individual rock types from the East Zone.

4.2.3 2005 Tailings Samples Columns

Two of the scavenger tails samples were studied. Both tests are ongoing. Graphs showing results are provided in Attachment M.

The tests have been running for more than 4 years and the leachate chemistry is generally stable. However, in the case of Sample S2-Scavenger Tails, the Mo release started to increase at around 900 days, and continues to rise. It is recommended that this test be continued to evaluate the trend in molybdenum release rates. It is proposed that the S1-Scavenger Tails column be terminated.

5 Proposed Changes to Monitoring Frequency

As testwork continues, less frequent monitoring results are needed to discern trends in leachate chemistry. Table 6 provides proposes changes to the leachate analysis for all tests proposed for continuation.

Table 1: Characteristics and Status of Pebble West Zone Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Date Started	Last data	Duration Years	NP kg CaCO3/t	AP kg CaCO3/t	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1] Years	Status and Recommendation	Reasons for Previous Decision or Proposed Change
Pre-Tertiary Plutonic Rock											
025-0617-0637	D	08-Feb-05	30-Aug-05	0.6	9.8	105.3	0.09	pH < 5	-	Completed	Stable leachate chemistry under acidic conditions
046-0113-0133	N	08-Feb-05	30-Aug-05	0.6	6.1	53.4	0.11	5<pH<6	-	Completed	Stable leachate chemistry under acidic conditions
046-0580-0600	G	08-Feb-05	30-Aug-05	0.6	8.0	45.0	0.18	pH neutral	8	Completed	Stable leachate chemistry. Not expected to generate acid in short term
112-0460-0480	X	08-Feb-05	30-Aug-05	0.6	5.6	91.6	0.06	pH neutral	6	Completed	Stable leachate chemistry. Not expected to generate acid in short term
117-0190-0210	N	09-Feb-05	31-Aug-05	0.6	5.6	58.1	0.10	pH neutral	5	Completed	Stable leachate chemistry. Not expected to generate acid in short term
118-0468-0488	M	09-Feb-05	31-Aug-05	0.6	37.5	36.6	1.03	pH neutral	24	Completed	Stable leachate chemistry. Not expected to generate acid in short term
3069-0927-0947	G	09-Feb-05	Ongoing	4.2	3.2	76.3	0.04	pH < 5	-	Continue	Will provide long-term data for this rock category
3123-0438-0458	D	10-Feb-05	01-Sep-05	0.6	41.8	152.5	0.27	pH neutral	39	Completed	Stable leachate chemistry. Not expected to generate acid in short term
3124-0872-0887	X	10-Feb-05	29-Jun-06	1.4	45.5	44.4	1.03	pH neutral	25	Completed	Stable leachate chemistry. Not expected to generate acid in short term
Pre-Tertiary Volcano-Sedimentary Rock											
019-0072-0090	WY	08-Feb-05	30-Aug-05	0.6	0.4	12.5	0.04	5<pH<6	-	Completed	Stable leachate chemistry under acidic conditions
033-0137-0155	Y	08-Feb-05	30-Aug-05	0.6	26.5	68.4	0.39	pH neutral	24	Completed	Stable leachate chemistry. Not expected to generate acid in short term
047-0350-0365	WY	08-Feb-05	27-Jun-06	1.4	6.1	104.7	0.06	pH neutral	5	Completed	Stable leachate chemistry. Not expected to generate acid in short term
118-0520-0535	Y	09-Feb-05	31-Aug-05	0.6	30.9	92.5	0.33	pH neutral	10	Completed	Stable leachate chemistry. Not expected to generate acid in short term
118-1220-1238	WY	09-Feb-05	31-Aug-05	0.6	32.6	77.5	0.42	pH neutral	15	Completed	Stable leachate chemistry. Not expected to generate acid in short term
3102-0568-0588	Y	09-Feb-05	31-Aug-05	0.6	18.5	97.8	0.19	pH neutral	11	Completed	Stable leachate chemistry. Not expected to generate acid in short term
3115-0988-1008	Y	10-Feb-05	29-Jun-06	1.4	10.0	46.3	0.22	pH neutral	10	Completed	Stable leachate chemistry. Not expected to generate acid in short term
3124-0188-0209	Y	10-Feb-05	Ongoing	4.2	0.1	77.2	0.00	pH < 5	-	Continue	Will provide long-term data for this rock category
Tertiary											
115-0054-0066	TC siltstone	09-Feb-05	31-Aug-05	0.6	29.0	6.3	4.64	pH neutral		Completed	Decreasing trend shown. Sample 115-0142-0163 was continued as an example of same rock type
115-0054-0066	TC siltstone	22-Feb-05	30-Aug-05	0.5	29.0	6.3	4.64	pH neutral		Completed	Reproducibility shown
115-0054-0066	TC siltstone	22-Feb-05	30-Aug-05	0.5	29.0	6.3	4.64	pH neutral		Completed	Reproducibility shown
115-0142-0163	TC arkose (higher S)	09-Feb-05	Ongoing	4.2	41.4	9.4	4.41	pH neutral		Complete	Stable leachate chemistry
3129-0253-0272	TC (and/vol cng)	10-Feb-05	29-Jun-06	1.4	83.8	3.1	26.80	pH neutral		Completed	Stable leachate chemistry
3129-0417-0435	TC (and/vol cng)	10-Feb-05	01-Sep-05	0.6	98.5	0.6	157.60	pH neutral		Completed	Release trends paralleled 3129-0253-0272 (same rock) which was continued a little longer.
4157 439-471	TF	01-Nov-05	Ongoing	3.5	21.9	116.9	0.19	pH neutral	6	Continue	Leachate chemistry not yet stable
4292 685-695	TC	01-Nov-05	Ongoing	3.5	83.7	75.3	1.11	pH neutral		Complete	Stable leachate chemistry
117-1055-1071	TBd (low S)	09-Feb-05	31-Aug-05	0.6	108.5	7.8	13.89	pH neutral		Completed	Similar results to sample 3102-0958-0978 on same rock type.
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Stable leachate chemistry
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Reproducibility shown
3102-0958-0978	TBd	10-Feb-05	Ongoing	4.2	103.3	21.3	4.86	pH neutral		Complete	Reproducibility shown
4292 415-430	TA/TD	01-Nov-05	Ongoing	3.5	17.2	27.2	0.63	pH neutral	11	Continue	Leachate chemistry not yet stable

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned.

Table 2: Characteristics and Status of Pebble East Zone Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Started	Last data	Duration Years	NP kg $CaCO_3/t$	AP kg $CaCO_3/t$	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1] Years	Status and Recommendation	Reasons for Previous Decision or Proposed Change
Pre-Tertiary Plutonic Rock											
224956	D	17-Jan-08	Ongoing	1.3	25.4	65.6	0.4	pH neutral	26	Continue	Some release rates not yet stable; Mo decreasing
224182	G	16-Jan-08	Ongoing	1.3	2.5	24.1	0.1	5<pH<6	-	Complete	Stable leachate chemistry under mildly acidic conditions
226293	Gp	17-Jan-08	Ongoing	1.3	31.3	16.6	1.9	pH neutral	30	Complete	Release trends parallel Sample 224956. Test for Sample 224956 will continue.
406692	Gs	15-Jan-08	Ongoing	1.3	6.4	398	0	pH<5	-	Continue	Leachate chemistry not yet stable
225026	Gs	15-Jan-08	Ongoing	1.3	7.5	30	0.3	5<pH<6	-	Continue	Leachate chemistry not yet stable
105391	Gs	16-Jan-08	Ongoing	1.3	1	452	0	pH<5	-	Continue	Leachate chemistry not yet stable
105456	Gs	16-Jan-08	Ongoing	1.3	2.3	233	0	pH<5	-	Complete	Stable leachate chemistry under acidic conditions
Pre-Tertiary Volcano-Sedimentary Rock											
220841 + 220842	Y	15-Jan-08	Ongoing	1.3	4.9	69.7	0.1	pH<5	-	Continue	Leachate chemistry not yet stable
406717	Y	15-Jan-08	Ongoing	1.3	7.4	305	0	pH<5	-	Complete	Stable leachate chemistry under acidic conditions
107326	Y	16-Jan-08	Ongoing	1.3	13.7	17.2	0.8	pH neutral	18	Complete	Release trends parallel Sample 107172. Test for Sample 107172 will continue.
107172	Y	17-Jan-08	Ongoing	1.3	5.8	37.5	0.2	pH neutral	7	Continue	Some release rates not yet stable; Mo decreasing
220076	Y2L	16-Jan-08	Ongoing	1.3	14.8	283	0.1	5<pH<6	-	Continue	Leachate chemistry not yet stable
Tertiary Rock											
104472	TC	15-Jan-08	Ongoing	1.3	10.7	27.5	0.4	pH<5	-	Continue	Leachate pH is still decreasing and this sample has highest release rates for some metals
406558	TC	17-Jan-08	Ongoing	1.3	62.5	47.8	1.3	pH neutral	62	Complete	Stable leachate chemistry
220394	TC	17-Jan-08	Ongoing	1.3	92.7	1.3	74.2	pH neutral		Complete	Stable leachate chemistry
219084	TF	16-Jan-08	Ongoing	1.3	106.4	1.3	85.1	pH neutral		Complete	Stable leachate chemistry
406502	TF	17-Jan-08	Ongoing	1.3	36.6	3.8	9.8	pH neutral		Complete	Stable leachate chemistry
219135	TW	15-Jan-08	Ongoing	1.3	70.4	7.5	9.4	pH neutral		Complete	Stable leachate chemistry
220364	TY	15-Jan-08	Ongoing	1.3	60.8	4.1	15	pH neutral		Complete	Stable leachate chemistry
219189	TY	17-Jan-08	Ongoing	1.3	51.5	4.7	11	pH neutral		Complete	Stable leachate chemistry
220366	TY	20-Nov-08	Ongoing	0.4	8.1	56.3	0.1	pH<5	-	Continue	Leachate chemistry not yet stable
222788	TA d	16-Jan-08	Ongoing	1.3	34.6	79.7	0.4	pH neutral	33	Complete	Stable leachate chemistry
226785	TB	16-Jan-08	Ongoing	1.3	83.3	53.8	1.5	pH neutral	66	Complete	Stable leachate chemistry
104775	TD	15-Jan-08	Ongoing	1.3	14	0.9	14.9	pH neutral		Complete	Stable leachate chemistry
221502	TD	20-Nov-08	Ongoing	0.4	28.2	47.8	0.6	5<pH<6	-	Continue	Leachate chemistry not yet stable
Ore Composite											
11486-001 AT COMP – 10m	Ore composite	9-Apr-08	Ongoing	1.0			0.09	pH neutral	13	Continue	Only sample of this type being studied. Leachate chemistry not yet stable

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned.

Table 3: Characteristics and Status of Field Barrel Test Waste Rock Samples in Humidity Cell Tests

Sample ID	Rock Type	Started	Last data	Duration	NP	AP	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1]	Status and Recommendation	Reasons for Previous Decision or Proposed Change
				Years	kg $CaCO_3$/t	kg $CaCO_3$/t			years		
ARLB003	G/D/N	18-Jan-08	Ongoing	1.3	28.90	183.44	0.16	pH neutral	12.40	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB006	G/D/N	18-Jan-08	Ongoing	1.3	21.30	100.00	0.21	pH neutral	11.72	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB001	Y	18-Jan-08	Ongoing	1.3	6.50	198.44	0.03	pH<5	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB002	Y	18-Jan-08	Ongoing	1.3	6.20	189.06	0.03	pH<5	-	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB007	TC/TF	18-Jan-08	Ongoing	1.3	90.20	22.19	4.07	pH neutral	58.01	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB008	TC/TF	18-Jan-08	Ongoing	1.3	70.10	6.56	10.68	pH neutral	72.24	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB004	TW	18-Jan-08	Ongoing	1.3	67.20	5.31	12.65	pH neutral	73.65	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB005	TY	18-Jan-08	Ongoing	1.3	63.40	15.00	4.23	pH neutral	27.57	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB009	TD	18-Jan-08	Ongoing	1.3	44.80	5.00	8.96	pH neutral	38.22	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data
ARLB010	TA+TB	18-Jan-08	Ongoing	1.3	48.10	1.56	30.78	pH neutral	58.19	Continue	To obtain long-term data for comparison with equivalent field (barrel) tests data

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned.

Table 4: Characteristics and Status of Waste Rock Samples in Subaqueous Columns

Sample ID	Rock Type	Zone	Started	Last data	Duration	NP	AP	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1]	Status and Recommendation	Reasons for Previous Decision or Proposed Change
					Years	kg $CaCO_3$/t	kg $CaCO_3$/t			Years		
3069-0927-0947	G	PWZ	28-Sep-05	Ongoing	3.6	3.2	76.3	0.04	pH<5	-	Continue	Leachate chemistry not stable. Increasing As release rate over time
3102-0568-0588	Y	PWZ	28-Sep-05	Ongoing	3.6	18.5	97.8	0.19	pH neutral	15.7	Complete	Stable leachate chemistry
3115-0988-1008	Y	PWZ	28-Sep-05	28-Jun-06	0.7	10.0	46.3	0.22	pH neutral	24.3	Completed	Stable leachate chemistry
3123-0438-0458	D	PWZ	28-Sep-05	28-Jun-06	0.7	41.8	152.5	0.27	pH neutral	63.2	Completed	Stable leachate chemistry
3124-0188-0209	Y	PWZ	28-Sep-05	Ongoing	3.6	0.1	77.2	0.00	pH<5	-	Complete	Stable leachate chemistry
3124-0872-0887	X	PWZ	26-Oct-05	Ongoing	3.5	45.5	44.4	1.03	pH neutral	42.3	Complete	Stable leachate chemistry
Composite13	TC	PEZ	10-Aug-08	Ongoing	0.7	80.7	6.3	12.91	pH neutral	483.0	Continue	Leachate chemistry not yet stable
Composite19	TA	PEZ	10-Aug-08	Ongoing	0.7	17.5	17.5	1.00	pH neutral	18.0	Continue	Leachate chemistry not yet stable

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned.

Note: A further 12 PEZ samples are currently being stored under aerated, humid conditions ('stored bag' tests). The long term intention is for a subset of these 'weathered' samples to be studied in subaqueous columns.

Table 5: Characteristics and Status of Tailings Samples in Humidity Cell Tests and Columns

Sample ID	Tails Type	Zone	Started	Last data	Duration	NP	AP	NP/AP	Recent Leachate pH	Calculated Time to onset of acid conditions[1]	Status and Recommendation	Reasons for Previous Decision or Proposed Change
					Years	kg $CaCO_3$/t	kg $CaCO_3$/t			Years		
Humidity Cell Tests (2005 Tails Samples)												
S2-Scavenger Tails		PWZ	11-Feb-05	07-Oct-05	0.7	24.4	5.3	4.6	pH neutral	12.7	Completed	Well defined stable or decreasing trends
S2-Bulk Cleaner Tails		PWZ	11-Feb-05	Ongoing	4.2	23.3	9.7	2.4	pH neutral	7.8	Complete	Well defined stable or decreasing trends
S1-Scavenger Tails		PWZ	11-Feb-05	07-Oct-05	0.7	19.9	4.7	4.2	pH neutral	14.7	Completed	Well defined stable or decreasing trends
S1-Bulk Cleaner Tails		PWZ	11-Feb-05	Ongoing	4.2	19.6	6.9	2.9	pH neutral	9.9	Complete	Well defined stable or decreasing trends
Humidity Cell Tests (2008 Tails Samples)												
PP08-3365	Y - bulk tails	PEZ	23-Apr-08	Ongoing	1.0	4.6	6.6	0.7	pH neutral	0.0	Complete	Well defined stable or decreasing trends
PP08-3607	Y - bulk tails (cyclone slimes)	PEZ	23-Apr-08	Ongoing	1.0	5.7	4.7	1.2	pH neutral	0.1	Complete	Well defined stable or decreasing trends
PP08-3850	Y - bulk tails (cyclone sands)	PEZ	23-Apr-08	Ongoing	1.0	6.3	8.4	0.7	pH neutral	0.6	Continue	To obtain long term data for this tailings type
PP08-3614	G - bulk tails	PEZ	23-Apr-08	Ongoing	1.0	5.7	2.8	2.0	pH neutral	0.1	Complete	Well defined stable or decreasing trends
PP08-3610	G - bulk tails (cyclone slimes)	PEZ	23-Apr-08	Ongoing	1.0	6.3	1.6	4.0	pH neutral	0.4	Complete	Well defined stable or decreasing trends
PP08-3849	G - bulk tails (cyclone sands)	PEZ	23-Apr-08	Ongoing	1.0	6.2	3.1	2.0	pH neutral	0.5	Continue	To obtain long term data for this tailings type
11486-003 bulk	G+Y bulk tails	PEZ	22-Oct-08	Ongoing	0.5	7.2	3.4	2.1	pH neutral	1.1	Continue	Leachate chemistry not yet stable
11486-003 OF	80G+20Y -- Cyclone O/F (slimes)	PEZ	22-Oct-08	Ongoing	0.5	8.3	3.4	2.4	pH neutral	1.1	Continue	Leachate chemistry not yet stable
11486-003 UF	80G+20Y -- Cyclone U/F (sands)	PEZ	22-Oct-08	Ongoing	0.5	7.0	6.3	1.1	pH neutral	1.2	Continue	Leachate chemistry not yet stable
11840-003 bulk cleaner	H-Bulk Cleaner Tails	PWZ	13-Aug-08	Ongoing	0.7	17.7	23.4	0.8	pH neutral	4.8	Continue	Leachate chemistry not yet stable
11840-003 pyrite	H - Pyrite Rougher Tails	PWZ	10-Sep-08	Ongoing	0.6	23.0	38.8	0.6	pH neutral	1.1	Continue	Leachate chemistry not yet stable
11840-003 bulk float	H - Bulk Tails (Bulk Scavenger Tails) as is	PWZ	10-Sep-08	Ongoing	0.6	22.3	4.4	5.1	pH neutral	10.5	Continue	Leachate chemistry not yet stable
11840-003 Phase II sands	H - Bulk Tails (Bulk Scavenger Tails) Cyclone Sands	PWZ	10-Sep-08	Ongoing	0.6	21.1	7.8	2.7	pH neutral	8.9	Continue	Leachate chemistry not yet stable
11840-003 Phase II OF	H - Bulk Tails (Bulk Scavenger Tails) Cyclone Slimes	PWZ	10-Sep-08	Ongoing	0.6	25.2	2.8	9.0	pH neutral	10.5	Continue	Leachate chemistry not yet stable
Columns (2005 Tails Samples)												
S2-Scavenger Tails		PWZ	11-Feb-05	Ongoing	4.2	24.4	5.3	4.6	pH neutral	147.1	Continue	Mo release rate increasing.
S1-Scavenger Tails		PWZ	11-Feb-05	Ongoing	4.2	19.9	4.7	4.2	pH neutral	119.8	Complete	Well defined stable or decreasing trends

[1] Onset of acid conditions is only expected in the case of those samples with NP/AP less than unity, i.e. there is insufficient NP to neutralize all the potential acid that might be generated in the sample. The timescale is calculated based on the observed rate at which NP is depleting in the sample concerned.

Table 6: Proposed Changes to Monitoring Frequency for Ongoing Tests

Parameter Group	Early Stage Frequency	Ongoing Frequency
Leachate recovery	Weekly	Weekly
pH, ORP, Conductivity	Weekly	Every other week
Acidity, alkalinity, TDS, Hardness, Chloride, Fluoride, Sulphate	Every other week	Every fourth week
Element Scan	Every other week	Every fourth week

Attachment A

Graphs for Pre-Tertiary Volcano-Sedimentary Rock Humidity Cells (Pebble West Zone)

SOA 086720

Attachment B

Graphs for Pre-Tertiary Plutonic Rock Humidity Cells (Pebble West Zone)

SOA 086721

Attachment C

Graphs for Tertiary Rock Humidity Cells (Pebble West Zone)

SOA 086722

Attachment D

Graphs for Pre-Tertiary Volcano-Sedimentary Rock Humidity Cells (Pebble East Zone)

SOA 086723

Attachment E

Graphs for Pre-Tertiary Plutonic Rock Humidity Cells (Pebble East Zone)

SOA 086724

Attachment F

Graphs for Tertiary Rock Humidity Cells (Pebble East Zone)

SOA 086725

Attachment G

Graphs for Humidity Cell Tests involving Barrel Test Samples

SOA 086726

Attachment H

Graphs for Humidity Cell Tests involving Ore Composite Sample

SOA 086727

Attachment I

Graphs for Subaqueous Rock Columns
(Pre-Tertiary, Pebble West Zone)

SOA 086728

Attachment J

Graphs for Subaqueous Rock Columns
(Tertiary, Pebble East Zone)

SOA 086729

Attachment K

Graphs for Tailings Humidity Cells (2005 Samples)

SOA 086730

Attachment L

Graphs for Tailings Humidity Cells (2008 Samples)

SOA 086731

Attachment M

Graphs for Tailings Column Tests (2005 Samples)

SOA 086732